

THE PEDAGOGICAL SEMINARY AND JOURNAL OF GENETIC PSYCHOLOGY

Child Behavior, Animal Behavior,
and Comparative Psychology

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VOLUME 63

1943

Copyright, 1943, by The Journal Press
Published quarterly by The Journal Press
Provincetown, Massachusetts, U. S. A.

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\$2.00 per volume
Single numbers \$4.00

QUARTERLY
Two volumes per year

September, 1933
Volume 24, First Half

Founded by G. Stanley Hall in 1881

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Copyright 1933 by The Journal Press
Provincetown, Massachusetts

Published as second-class matter August 5, 1907, at the post-office at
Provincetown, Mass., under the Act of March 3, 1879.

Accepted as second-class matter, May 12, 1937, at the post-office at
Provincetown, Mass., under the Act of March 3, 1879.

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EDITED BY

Carl Murchison

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THE JOURNAL PRESS

2 Commercial Street

Providence, Massachusetts

U. S. A.

\$7.00 per volume
Single number \$4.00

Two volumes per year
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Volume 63, First Half

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SEPTEMBER, 1943

(Manuscripts are printed in the order of final acceptance)

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(OVER)

Copyright 1943, by The Journal Press
Provincetown, Massachusetts

Entered as second-class matter, August 3, 1897, at the post-office at
Worcester, Mass., under the Act of March 3, 1879

Reentered as second-class matter May 11, 1937, at the post-office at
Provincetown, Mass., under the Act of March 3, 1879

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EFFECT OF ACROPHOBIA UPON READING ABILITY
AS MEASURED BY READING COMPREHENSION
AND EYE-MOVEMENTS IN READING*

Department of Psychology, Clark University

ARTHUR B. WARREN AND VERNON JONES

A. PURPOSE

The purposes of this investigation were to determine (a) the extent to which acrophobia might be revealed by behavior during reading about high places and (b) the degree to which fear of high places decreased the efficiency of reading.

The particular fear, acrophobia, was chosen for study for several reasons: it is a fear which exists very pronouncedly in some individuals but very little indeed in others; it can be easily aroused under experimental conditions, and it relates itself today to vocational and avocational choices. It might be maintained, of course, from a practical point of view that every individual knows in a measure whether or not he is afraid of high places, and in this crude sense he does not need any test or any guidance on this question; but he has no standard of comparison to indicate to him the degree to which his fear is pronounced enough to interfere with mental work.

B. PROCEDURE AND APPARATUS

The general plan of the experiment was to select and test intensively a small group of college students who were known not to be afraid of high places and another group of comparable subjects who were known definitely to be afraid. The groups finally selected consisted of four subjects in the control, or non-fear group, and of six subjects in the experimental group. Both groups were given the same tests under the same conditions. The tests consisted of the photographing of eye-movements of each subject and the measurement of efficiency of recall of the material read in three different passages given under two different conditions. The reading passages were stories about 400 words in length. One passage was an ex-

*Received in the Editorial Office on October 15, 1941

citing story with no reference to high places. This we shall refer to as the control passage. The other two involved dramatic descriptions of steeple jacks, riveters, and others working on high places and the dangers involved.

The apparatus used in this study was the A.O.C. ophthalmograph.¹ The ophthalmograph is a camera which photographs on motion-picture film the eye-movement of both eyes during reading. It operates on the principle of the corneal reflection method in which a bright beam of light is focused on the cornea of the eye. The cornea acts as a mirror and, as the eye moves in reading, the beam of light reflected from the cornea moves and its motions are recorded on the photographic film. The light, both for illumination of the cornea and for the reading material, is emitted by two 21-candle-power lamps placed about 10 inches from the eyes. This illumination does not disturb the subject and is sufficient for photography. The film on which the eye-movements are recorded is motor driven at the uniform rate of speed of one-half inch per second. This enables one to calculate the speed of reading by measuring the length of the film used. The subject is free to read at his own rate of speed, there being an arrangement whereby he flips into place a new card bearing more of the text as soon as he is ready for it. The ophthalmograph is mounted on an adjustable stand so that the height of the camera can be easily raised or lowered to suit the individual.

The method of procedure in presenting the reading material and recording the eye-movements was identical for the experimental and control subjects. Each subject was tested first on the control selection, eye-movement records being taken during the entire reading period. Immediately following the reading of this selection, the subject was tested for the retention of the material read by having him give a written account of all he could remember of the situations and incidents in the story. Following this, the subject was required to read the first experimental selection—a story descriptive of a

¹The writers are indebted to the American Optical Company, Southbridge, Mass., for the loan of this convenient instrument for this experiment. It was specially designed by this company for the purpose of photographing eye-movements in reading. Dr. Robert Beitel of the research department of the above mentioned company gave invaluable assistance in setting up the apparatus in this investigation.

worker on a very high place who lost his footing and fell. Eye-movements and comprehension-retention were measured as in the control selection

The final step was to combine the effect of reading about high places with that of doing the reading on a high precarious place. To accomplish this each subject was required to read the second experimental selection while sitting on an armless chair placed as far out as possible on a fourth-story window ledge. Every subject tested under these conditions was protected by a safety belt, but the rope attached to the belt was sufficiently loose to avoid giving any very real sense of security to those who suffered from acrophobia. Again eye-movements and reading comprehension and retention were measured as on previous selections

C THE METHOD OF ANALYSIS OF DATA

Detailed analysis was made of the ophthalmograph and retention records. In analyzing the ophthalmograph records, calculations were made separately for the following variables. (*a*) speed of reading, (*b*) number of fixations per 100 words; (*c*) number of regressions per 100 words, and (*d*) average duration of fixation.

The photographic film moved through the camera at a constant rate of speed of one-half inch per second. Obviously this made it possible to compute the rate of reading very simply. Also it was possible to identify rather easily what parts of the eye-movement record corresponded to various critical parts of the stories. The frequency of fixation was found simply by counting the number of fixations for 100 words of the text.

On the photographic films each line of reading looks like the outlines of a staircase, the right zigzag line representing the right eye and the left line the left eye. The fixation in each case is comparable to the height of the step. A regressive movement appears as a reverse step in the staircase.

In addition to these separate measures of eye-movements, careful study was made of the various parts of each record in an effort to detect any characteristic eye-movement patterns appearing for different parts of the text and for the different conditions of reading.

In analyzing the results on retention, each selection was divided into memory units, and the subject's retention score was the per-

centage of these total possible memory units which he mentioned in his account. A careful study was made to determine whether there was any parallel between disturbing sections of the stories read, on the one hand, and memory units missed or eye-movement disturbances, on the other.

D. RESULTS

The detailed analysis of the results on each of the measures of eye-movements reveals the interesting fact that the emotional disturbances manifested themselves in different ways with different subjects. This is so much the case that on no single measure (such as speed of reading, number of fixations, number of regressive movements, or length of fixations) was a reliable difference found between the control and the experimental subjects. Several subjects in the experimental group might show a certain tendency, say, toward and increase in regressive movements, while other subjects

TABLE 1
SHOWING RESULTS ON SEPARATE EYE-MOVEMENT MEASUREMENTS FOR CONTROL AND EXPERIMENTAL GROUPS

Subjects	No. of fixations per 100 words		Length of fixation pauses		No. of regressions per 100 words	
	Difference 2-1*	3-1	Difference 2-1	3-1	Difference 2-1	3-1*
<i>Control</i>						
1	-19	-7	+02	-	-1	-
3	-4	-2	-.01	+.02	-3	-1
6	-16	-	-	-	+1	+2
12	+4	+10	-	-	+2	+4
Median	-10.0	-1.0	.00	.00	0.0	+1.0
Mean	-8.8	+2	.00	.01	0.0	+1.3
<i>Experimental</i>						
2	-.2	+6	-.03	+02	+2	+10
4	-.5	-12	-	-	-1	-6
5	-4	-4	+01	+.03	-2	-2
7	-4	+4	-.02	-	-	+6
8	-5	-5	+.01	+.01	-1	-2
10	+3	-5	-.02	-.01	-1	-2
Median	-4.0	-4.5	.01	.00	-0.1	-2.0
Mean	-2.8	-2.7	.01	.00	-0.5	+0.7

*Selection 1, it will be recalled, was a control selection which involved no mention of high places.

would be found who showed the opposite tendency. Table 1 will show these results on the separate measures

A study of Table 1 will show that there are no consistent and reliable differences between the experimental and control subjects on any of the separate measures made. These results lead one to suspect that with adult subjects reading habits are so well ingrained that even under the conditions of rather pronounced fear no one component in the eye-movements in reading will be sufficiently upset to serve as a crucial test to distinguish the fearful from the non-fearful

Having failed to find that any single measure of eye-movements distinguishes between the normal subjects and those suffering from acrophobia, we undertook the study of total patterns in the eye-movements to see if any gross abnormalities could be detected which the measures taken one at a time did not reveal. By "total patterns" here we do not mean anything esoteric or non-objective. If, for example, a subject had all straight, clear-cut fixations in the control selection and then showed in the experimental selections curved fixations and wandering of the eyes momentarily, this would be identified as a deviation from the normal pattern.

This analysis on the basis of deviations from normal patterns of eye-movements proved to be the most sensitive measure of the effect of fear on mental activity in the present experiment. Unfortunately, this method does not lend itself to statistical reporting and is open to the objection that to one experimenter a record may seem to show abnormal patterns, whereas to another it may not. This may be a serious objection, especially when it is not feasible to give extensive samples of the photographic films. However, two short samples will be given here, not with the idea of meeting this objection—they are too meager for that—but for the purpose of indicating that real differences may be noted in the record of an experimental subject, especially when reading on a high place, whereas in the case of a control subject no differences may be noted. The two cases chosen are typical of the groups from which they were taken.

Figure 1 gives a sample of the record for control subject No. 3. The portion of the record enclosed in the bracket labelled *A* in Selection 1 represents one line of reading. It is composed of fixations and regressions, a fixation appearing as a vertical line on the

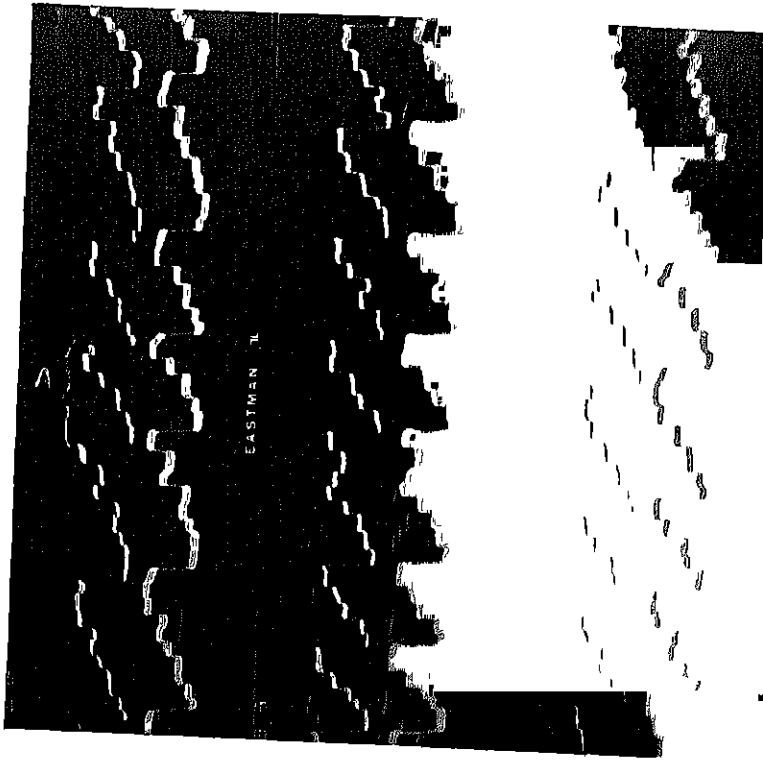


FIGURE 1
SHOWING EYE-MOVEMENT RECORDS FOR THREE SELECTIONS FOR A TYPICAL
SUBJECT IN THE CONTROL GROUP

record. A regression is also a vertical line, but it appears to the left of and below the previous fixation or regression. In analyzing the series of records of this subject, the record of the control reading (Selection 1) is taken as normal. Records of Selections 2 and 3 are compared to this record as a standard. In each of these selections we see the usual fixations and regressions. There is nothing unusual about them, and the same imperfections in the reading habit which are found in Selections 2 and 3 are also found in the control Selection 1.

In contrast to the records of subject No. 3 are those of No. 8, an experimental subject. The records of No. 8 are a fair repre-

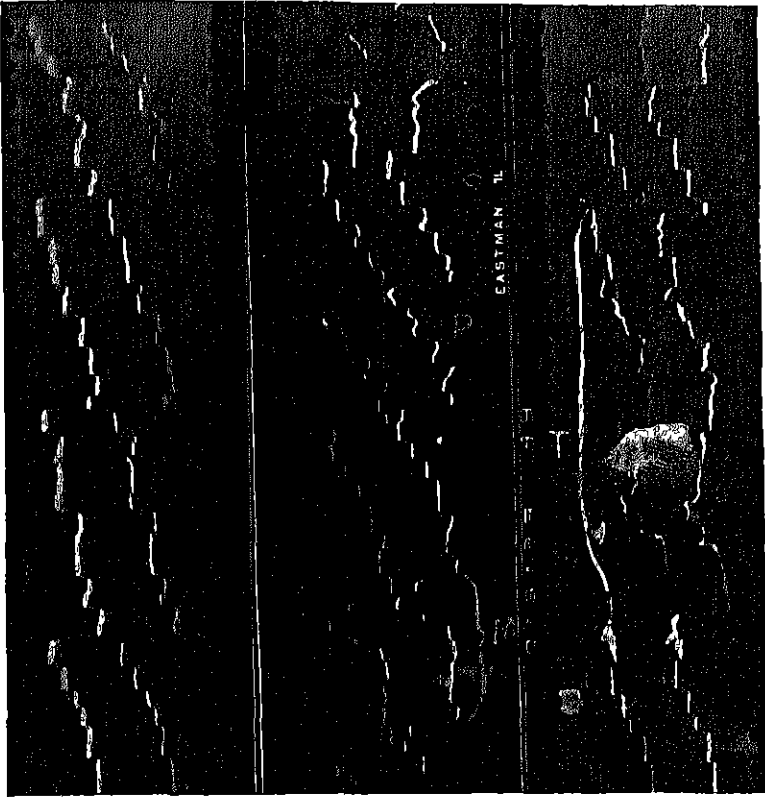


FIGURE 2

SHOWING EYE-MOVEMENT RECORDS FOR THREE SELECTIONS FOR A TYPICAL SUBJECT IN THE EXPERIMENTAL GROUP

sensation of his group. This subject was quite frank about being afraid of height.

He is known to have refused to go to the top floor of the Empire State Building. In studying No. 8's record it will be seen that his record on Selection 1 is quite regular with sharp horizontal return sweeps and straight-line fixations. In Selection 2, however, one will note portions of the record where the fixations are curved. Note section marked *P* in particular. These curved fixations indicate that the eyes are not remaining focused on one grouping of words after another while the meaning is extracted. They are wandering, and

this graphically shows inattention. But this inattention seems to be of short duration, for the eye-movements in the next line seem to be fairly regular. In the section marked *M*, the record is especially irregular, and it is interesting to note that these irregularities occurred while the subject was reading one of the lines from the following two sentences:

I was hanging far above the earth with nothing at all between me and horrible death, I turned my head slowly and saw
I was hanging by my overalls from a plank projecting out about ten feet from the building.

In Selection 3 there is a great amount of irregularity. In the whole area marked *T* there seems to be no real reading going on. This section of the film came immediately after a vivid word picture of fear of falling and paralleled these lines:

The sweat stood out in great wet drops. They had an intensity about them that will be impossible to forget.

Patterns of disturbances such as these were found with all the experimental subjects and with none of the control subjects. In some cases the eyes went completely off the page momentarily and the subjects twisted, frowned, and grasped on the rope or anything else in reach. In reading Selection 2 the disturbances were much milder and occurred only at dramatic points where falling or thoughts of falling were depicted. In the reading of Selection 3 outside the window, the irregularities of the reading patterns were much more widespread. This was, of course, due mainly to the fact that the subjects were sitting precariously in a high place, but the reading of the descriptions of high places—or even the glancing at it if the individual were too disturbed to do any real reading—served to intensify the irregularities. There were fairly large individual differences within the experimental group as small as it was. One or two subjects were apparently disturbed at intervals, but were able to read rather effectively except for the periods of momentary disturbance. One of the most disturbed subjects, however, was unable to do more than look at the words more or less in isolation. His eyes moved cross the page as if he were reading, but the tell-tale patterns of the eye-movements agreed with the introspective report of the subject in indicating that attention was

badly upset. The real perception span was often one word regardless of the manner in which the eye moved along the line. We were unable to discover this by single measures, however, such as number or length of fixation pauses, for apparently old habits involving a customary number of fixations per line tended to carry even the most disturbed individual along at almost his usual stride.

The final analysis made in the study was based on measures of the reading comprehension of the subjects under the different conditions. This measure did not prove to be as delicate as that of eye-movement patterns in revealing minor disturbances, but the results lend themselves readily to quantitative treatment and demonstrate quite vividly the extent of the mental disturbance in those subjects which were most affected by acrophobia. By saying that the eye-movement patterns were more sensitive in revealing minor disturbance, we mean that even by a very brief lapse of attention, lasting only during one or two fixation pauses, would be revealed by the eye-movement records, whereas such a brief lapse would often not show up on the test of comprehension because the total understanding of the story might easily fill in or conceal minor gaps. We should expect, therefore, that the individual who was only mildly affected by high places would show only small loss, if any, in Selections 2 and 3 as compared with Selection 1, but we should expect the individual who was greatly subject to acrophobia to show pronounced loss especially under the conditions under which Selection 3 was given. In other words, any individual differences that existed among subjects in the intensity of their fear of high places would be magnified in the comprehension test on Selection 3.

The results on the comprehension test are given in Table 2. It will be recalled that comprehension was measured by counting, according to a prearranged key, the total number of memories which the subject gave of the material read immediately after the reading. The subject read each selection only once, and the eye-movement photographs were made throughout the reading. In working up the results presented in Table 2, four steps were taken. The meaning of the entries in the table can best be explained, perhaps, by listing these steps:

1. The total number of significant memories given by each subject on a selection was divided by the total number of possible mem-

TABLE 2

A COMPARISON OF THE CONTROL AND EXPERIMENTAL GROUPS IN READING COMPREHENSION ON EACH OF THE THREE SELECTIONS

Results are given in terms of Differences between percentage remembered in Selections 1 and 2, 1 and 3, and 2 and 3

	Differences in per cent remembered		
	Selection 2-1	Selection 3-1	Selection 3-2
<i>Control</i>			
1	10	10	0
3	20	26	6
6	2	5	3
12	46	51	5
Median	15.0	18.0	4.0
Mean	19.5	23.0	3.5
<i>Experimental</i>			
2	8	4	-4
4	-4	-11	-7
5	16	-8	-24
7	6	-1	-7
8	-13	-15	-2
10	-32	-60	-28
Median	1.0	-9.5	-7.0
Mean	-3.3	-15.2	-12.0
Diffs between Means	22.8	38.2	15.5
<i>t</i>	2.2	2.7	2.7

ories in our key for that selection. This result was called the percentage memory.

2. The percentage memory of each subject for Selection 1 was subtracted from the percentage memory for Selection 2. In the control group the percentage memories on Selection 2 ran appreciably higher than on Selection 1 (median difference = +15). This might have been due partly to a possible difference in the difficulty of the selections from the point of view of memories. It was almost certainly due in some measure to the better adjustment of the subjects to the ophthalmograph in Selection 2.

3. The percentage memories in Selection 3 were compared with those in Selection 1 and 2.

4. The average differences for the control subjects are given as a basis with which to compare the individual results for the experimental subjects.

The most striking results in Table 2 occurs in comparing the control and experimental groups on the differences between Selections 3 and 1. Every individual in the control group reported more correct memories on Selection 3 (read on a high place) than on Selection 1. However, in the experimental group all subjects except one made a lower score on Selection 3, and this one exceptional case made a smaller gain than the lowest gain in the control group. Thus the two distributions do not overlap at all. The median difference between Selections 1 and 3 was +18 in the control group and -9.5 in the experimental group. The mean differences were +23.0 and -15.2, respectively. The difference between these means is 38.2. The "*t*" based on these distributions indicates that the probabilities are only about 3 in 100 that differences as large as these would have occurred by chance. If we assume that within our experimental group some of the cases were much more disturbed by fear of high places than others—an assumption which is borne out by all our results—we get some idea of how serious the disturbance in mental work must have been for such a subject as No. 10 or No. 8.

The descriptions of high places read under normal conditions were, of course, not so disturbing as were such descriptions read on a high exposed place (compare 2-1 with 3-1). However, it is interesting that the average and median differences between the experimental and control groups for 2-1 were as great as they are. The differences are not quite statistically reliable, as indicated by the "*t*." The probability that such a difference could have occurred by chance in two random populations of the sizes here used is 7 in 100. The most liberal figure which one could accept for statistical reliability in a case such as this would be 5 in 100. Again, however, it is interesting to note the scores for the two subjects who displayed most fear, Subjects 8 and 10.

Both these results on reading comprehension and those on eye-movements indicate that it is possible to produce, at least in some individuals a disturbance in their mental activity by having them read material which graphically describes high places and falling from high places. The writers suspect that it is the subjects who are most seriously affected by acrophobia who could probably be identified by the reading method of this type, but this is not certain.

for there was no criterion of the intensity of the fear of the subjects in this experiment which was independent of the reading lists.

E. SUMMARY AND CONCLUSIONS

The present experiment involved the study of the reading comprehension and eye-movements in reading of two small groups of college students, one group consisting of men who were known to fear high places, and the other consisting of men who had no such fear. Three reading selections were chosen, two of which were descriptions of high places and falling from high places, and the third was a control selection. The control selection and one of the experimental selections were read in the laboratory. The other selection was read by each subject while sitting in an armless chair attached to the outer edge of a fourth-story window ledge. A photographic record was made of the eye-movements in reading of all subjects in all selections. Reading comprehension was measured by the number of "memories" which the subject could give immediately after the reading of each selection.

The main findings were:

1. Variations in eye-movement patterns in the experimental subjects revealed disturbances. These occurred among the acrophobic subjects for very brief intervals while they read in the laboratory about high places. The disturbances occurred in more pronounced form, and for longer duration, when these individuals were reading on a high place.

2. The reading comprehension of the experimental group, on the average, was decidedly reduced during the period when reading was conducted on a high place. There were notable individual differences, however, one subject showing little loss while others were able to report almost nothing beyond isolated words which they had seen in the passage read.

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A SURVEY OF THE ATTITUDES AND ACTIVITIES OF FATHERS*

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A. HISTORY OF THE PROBLEM

Fathers have had relatively little attention from artists, poets, research workers, and authors. The artists have pictured fathers in comic strips, the poets have sung about them in humorous mediocre verse, the research workers have treated them in scant articles, and the authors have written about them in few books. Writings about fatherhood come mainly from four sources of interest: studies of primitive fatherhood, short observations of fathers on the job, organized suggestions for fathers from child training enthusiasts, and memories of great fathers.

Malinowski (11) and Hartland (7) are good illustrations of studies of primitive fathers. Malinowski (11) states that the sociological pattern of fatherhood existed earlier than the physiological pattern, for, among such primitive groups as the Trobrianders, there was ignorance of paternity. Babies of Trobrianders were reincarnated spirits of the tribe, announced by the spirit of a maternal kinswoman and brought by this same spirit to reside in the hair and head of the pregnant woman. The future child worked from the mother's head down into her abdomen with the disappearance of the menstrual flow, which nourished the child inside the mother. The father was essential to protect the pregnant mother from sex experiences at this time, to receive the child into his arms and to care for the child at all times. The relationship through companionship and care was so strong that the face of the child was moulded to resemble the father although its blood descent was traced only through the mother. Hartland (7) adds many other primitive customs and rites about paternity from other tribes.

Short observations of fathers concerning their activities with their children are occasionally found in magazines for parents. A few

*Received in the Editorial Office on October 16, 1941

longer articles (2, 16, 15, 10) present a certain perplexed bewilderment of some fathers concerning what ethical principles and attitudes they should teach their children. Two expectant fathers met by accident in a sandwich shop and decided that ignorance added much to their misery. One of them (19) wrote at length concerning fatherhood in lower animals, the future father's attitudes and activities during pregnancy and birth, and certain general principles in child training that fathers should understand. Russel (13) believes that men no longer want children since they hamper the vigorous young man on the road to social success, while Dell (5) believes that men want children for emotional reasons to prove they are fully and completely a man. Since men have found time to write long and frequent treatises concerning most every subject under heaven, one should conclude they had considered rather lightly their paternity.

People interested in child welfare have considered the paternal job less lightly and have tried to increase interest in fatherhood. Corbin (4) and Josmak (8) give material used in lectures for expectant fathers who attended a class at the Maternity Center Association. Victor (17), in a humorous and understanding manner, shows how the forgotten man of propagation may become and stay an active parent with however, most emphasis upon activities prior to the birth of the child. Wile (18) undertakes to discuss understandingly if not entertainingly, men's problems from courting time to dying time with four chapters treating principles of paternal adjustment to the children. Richardson (14), in a series of 20 questions, and Blatz and Bott (3) in a questionnaire of 20 items on principles of child training, have attempted simple measures of father efficiency.

Some children have written most understanding and valuable accounts of how their fathers influenced them. A collection of informal stories by famous people (1) about their fathers presents the wide sphere of possible paternal influence upon children. Morrow (12) gives a fine picture of the tender guiding influence of Bronson, the father of "Little Women." Although he did not usurp the mother's sphere, Bronson was more than teacher and more than father to his girls. Gosse (6) shows the striking conflict that may develop between two different temperaments in the father and son.

relationship. Koizumi (9) etches delicately the problem of a loving father disciplining a sensitive son. These studies of fathers present valuable evidence of the great possibilities of fatherhood.

A survey of these four sources shows that little is known about what fathers usually do for their children in the home.

B. THE PROBLEM

This study was undertaken to investigate the nature of the various activities and attitudes of fathers in relation to their paternal duties in the home. A clearer picture of the average American father should be obtained from such a study with indications of specific strength and weakness of that rôle.

C. TECHNIQUE OF RESEARCH

As a basis of this study 300 personal interviews with fathers were made by psychology students who followed a detailed questionnaire of over 50 items. Students were juniors and seniors with at least six hours in psychology. The specific questions will be given with summary of results, but the general contents of the questionnaire will be briefly stated at this point. Specific personal data concerning the fathers included their age, occupation, education, and time spent at home. Other specific data concerning the home situation included the amount the mothers worked outside the home, the size of the family, the age and sex of the children. Questions were included concerning the attitudes of fathers toward the weak and strong points of the grandfathers, toward the weak and strong points of their own paternal activities, toward the care that mothers gave their children and finally toward the children themselves. The questionnaire attempted to get a picture of the nature of the guidance fathers gave in early childhood from one to five years, in later childhood from six to 12 years, and in the adolescent period from 14 to 21 years. The facts obtained in this questionnaire of course indicated what fathers think of themselves as fathers and would not constitute an objective evaluation of their paternal duties.

D. CONSIDERATION OF DATA AND RESULTS

1. *Specific Personal Data Concerning Fathers*

From Table 1 various facts concerning the age, occupation, edu-

TABLE 1
PERSONAL DATA FOR FATHERS WITH REGARD TO AGE, OCCUPATION, EDUCATION,
AND TIME AT HOME

	Number of cases	Per cent of cases
<i>Range of ages in years</i>		
Omitted data		
20-24	11	4
25-29	1	1
30-34	11	4
35-39	18	6
40-44	31	10
45-49	43	14
50-54	69	23
55-59	63	21
60-over	31	10
Total	19	6
	300	99
<i>Types of occupations</i>		
Omitted data		
Unskilled labor	7	2
Semiskilled labor	7	2
Skilled labor	77	26
Business	39	13
Professions	60	20
	110	37
<i>Amount of Education</i>		
Eighth grade or under		
Some high school training	47	16
Incomplete high school	93	31
Complete high school	40	13
Training beyond high school	53	18
Business school	121	40
Normal school	11	4
Some college training	4	1
B.A. or B.S. degree	24	8
Advanced college degrees	82	27
M.A. or M.S.	39	13
Ph.D.	19	6
M.D.	12	4
	8	3
<i>Hours at home</i>		
Weekdays		
Omitted data		
0-2 hours	13	4
3-4 hours	44	15
5 or more hours	126	42
Saturdays	117	39
Omitted data		
0-2 hours	8	3
3-6 hours	25	8
All afternoon	75	25
All day	122	41
Sundays	70	23
Omitted data		
0-2 hours	8	3
4-5 hours	6	2
8 hours	19	6
All day	15	5
	252	84

cation, and time at home may be found with reference to the fathers used in this study. The age range was between 20 and 79 years with over half of the fathers grouped between 40 and 60 years of age. The occupations of the group indicated fair financial circumstances. The fact that so few of the wives worked, also substantiated this. Over one-third were in the various professions while less than one-third were semi-skilled or unskilled laborers.

The fathers were well educated for the most part. Only 16 per cent had failed to go beyond the eighth grade. Some high school training had been received as the only training for 31 per cent. Forty per cent had taken training beyond high school, and 13 per cent had advanced degrees.

The analysis of the time fathers spent at home was made on the basis of weekdays, Saturdays, and Sundays since the day made considerable difference. On weekdays 39 per cent had five or more hours at home. Two-thirds of the group had half or all of Saturday at home. All of Sunday was spent at home by 84 per cent. If time at home was an important factor, these fathers had ample time to do a lot of fathering.

2 Other Factors Concerning the Home Situation

Data concerning some other factors in the situation, such as amount of work the mother did outside the home, the number, age, and sex of the children in the families, was also included in the study. Table 2 states this data.

The mothers had ample time to give to the wants of their children since 258, or 86 per cent did no work outside the home. Thirty, or 10 per cent, of mothers worked part or full time outside the home. Twelve, or 4 per cent, of mothers spent much time in various clubs and organizations. The amount of care given by fathers to the children in the case of the women who worked, was not noticeably greater than in the cases where women did not work.

The 300 families included 874 children. Families had one child in 14 per cent of cases, two children in 35 per cent, three children in 26 per cent, and four children in 13 per cent. Only 19 per cent of the families had children in the first five years of childhood. Families had children between six and fourteen years in 46 per cent of cases, while 70 per cent of families had children of adolescent

TABLE 2
DATA CONCERNING NUMBER OF CHILDREN IN FAMILIES, AGE OF CHILDREN,
AND DISTRIBUTION OF SEXES

		Number of families	Per cent of families
<i>Number of children in family</i>			
One		41	14
Two		104	35
Three		79	26
Four		38	13
Five		14	5
Six		15	5
Seven		3	1
Eight		2	1
Nine		3	1
Twelve		1	0
Total		300	100
<i>Age of Children</i>			
Five years or less			
One child		56	19
Two children		31	10
Three children		18	6
Six through fourteen years		7	2
One child		139	46
Two children		70	23
Three children		54	18
Four children		9	3
Six children		5	2
Fifteen years or over		1	0
One child		211	70
Two children		49	16
Three children		75	25
Four children		47	16
Five children		25	8
Six children		7	2
Seven children		6	2
Eight children		1	0
		1	0
<i>Relationship of sexes</i>			
Females—	None		
	One	43	14
	Two	108	36
	Three	85	28
	Four	34	11
	Five	8	3
	Six	2	1
Males—	Omitted data	1	0
	None	19	6
	One	68	23
	Two	112	37
	Three	72	24
	Four	18	6
	Five	4	1
	Six	3	1
	Seven	1	0
	Eight	2	1
	Omitted data	1	0
		19	6

age, that is, 15 years or more. Nearly three-fourths of the fathers were familiar with the problems of child training at most of the ages. However estimates of childhood problems, for the most part, were made in retrospect. Inadequate data on the sex of the children was found in 19, or 6 per cent, of families. The families had 369 boys and 428 girls, that is, an extra blessing of 59 more girls than boys. Of the families 68, or 23 per cent, had only girls, while 43, or 14 per cent, had only boys. Altogether then 37 per cent of the families were made up of children of one sex only.

3 Attitudes of Fathers Toward Their Paternal Duties

a. *Attitudes toward memories of the grandfathers.* Since the memory of their own childhood training might color to some extent paternal attitudes, fathers were asked to state the weak and strong points of their own fathers. If a father mentioned several items these were included. Consideration of the weak points of the grandfathers brought to light various interesting facts. Data on this question was incomplete for 47 questionnaires. No faults were remembered by 22 of the fathers. Two grandfathers would indeed have been happy to read their sons' estimates of them: "*I don't think he had any faults*" and "*He was the perfect father.*" Only 19 grandfathers neglected to provide satisfactorily for the material welfare of their children with the most frequent charge, "*He didn't give us an education*" Table 3 should be referred to for additional data.

The lack of companionship and interest was resented most bitterly in 25 per cent of the weak points mentioned. Several used the very expressive phrases "too cold" and "much coldness" in regard to lack of companionship. The length of the comment may be considered as an indication of tension in the following comments:

"Too little affection displayed, too much devoted to work"

"Not enough time and not enough display of affection"

"Did not treat us as pals but was very cool and too busy to bother,"

"He did not understand that kids would be kids,"

As one might suppose, the nature of discipline and training was remembered as a weak point in 32 per cent of the items. Only 9

TABLE 3
WEAK POINTS OF THE GRANDFATHERS' TRAINING

	Times mentioned	Per cent of times
1. Data incomplete cases	47	15
<i>a</i> Data omitted	26	8
<i>b</i> Meaning not clear	5	2
<i>c</i> Grandfather died early or ran away	16	5
2 No weak points remembered	22	7
3. Defect in provision for welfare	19	6
<i>a</i> Children had too much money, clothes, etc	6	2
<i>b</i> Lack of education	8	3
<i>c</i> Children worked too hard	5	1
4 Defect in companionship and interest	74	23
<i>a</i> No understanding, affection, comradeship, etc	57	18
<i>b</i> Father away from home much	17	5
5 Nature of discipline and training	99	32
<i>a</i> Too strict discipline, causing fear	28	9
<i>b</i> Inconsistent in punishment, easy, lenient	58	19
<i>c</i> Left too much discipline to wife	13	4
6. Poor teaching of some ideal or character trait	52	17
<i>a</i> Directly by lack of teaching emphasis		
(1) No training in responsibility	10	3
(2) No sex training	4	1
(3) Miscellaneous types	2	1
<i>b</i> Indirectly by example		
(1) Impatience, poor temper control, etc	9	3
(2) Narrow minded, too conservative	15	5
(3) Partiality, favoritism	6	2
(4) Miscellaneous virtue lacks	6	2
Total items	313	

per cent remembered the grandfather as too strict. Typical comments were

"His punishment was exaggerated; he would hit with his hands and once with his fist."

"He gave so much corporal punishment we were afraid to go to him with problems."

The other 23 per cent of items in this group stated that grandfathers were too easy, too inconsistent, or left the discipline to mothers. The comments relative to the too easy grandfathers, however, never had any specific statement that indicated a definite unpleasant memory, such as the comments on the too stern grandfathers had indicated.

About 17 per cent of grandfathers were remembered as teaching some ideal or character trait very poorly. Lack of teaching emphasis upon certain traits was noticed in 5 per cent of these items, this usually referred to lack of training in the use of money. The other 12 per cent of items in this group complained of the example set by the grandfathers. The grandfathers erred less in terms of temper control than in narrowmindedness and conservatism. The length of comment and the specificity indicated the feeling involved in the following

"He was too tight laced on some views, did not advance with the times"

"He supposed we had the same seriousness that he had"

"He was too strict about going to church, and about the evils of smoking and drinking"

"He was too cautious and old fashioned about cars"

"Sports are absolutely unnecessary, children should rest."

Some fathers showed a wholesome conservatism. Some were not sufficiently sensitive to modern trends and changes. A rather bitter complaint concerning a poor sharecropper father in the south was that he would not provide the children with new small dinnerpails like those of other children, but forced them to use an old milk-pail as he had done. The comments concerning favoritism were few in number but very specific. The following were typical.

"The oldest did the housework and had to look after all the others"

"The last two got off easier than the first two in many ways"

"He was too strict with the boys and too lenient with the girls"

"Some of the children were given a better education than others."

Data on the strong points of the grandfathers was lacking on 34 of the questionnaires. Only five of the grandfathers had no strong point or as one father put it "*Left no strong impression*". Provision for welfare was remembered in 22 or 7 per cent of items with education the most important provision. Good companionship and understanding of problems were remembered as strong points in 8 per cent of the items. Happy indeed must have been the home where the grandfather was remembered as "*Our best friend, very close to all the children.*"

Good discipline, respect, and obedience represented 28 per cent of the strong points recalled. Some of the comments relative to this were very descriptive

- "What he said went"
 "Father rules the roost"
 "Father had discipline without questions."
 "We did what we were told."
 "Father wasn't afraid to use the whip"
 "We had to mind"

The phrase "prompt obedience" occurred frequently. There apparently existed a clear ideal of the father as a good disciplinarian who merited respect and prompt obedience. Table 4 should be consulted.

TABLE 4
 STRONG POINTS OF GRANDFATHERS' TRAINING

	Times mentioned	Per cent of times
1 Data incomplete on cases		
<i>a.</i> Data omitted	34	10
<i>b.</i> Meaning not clear	12	3
<i>c.</i> Grandfather died early or ran away	6	2
	16	5
2 No strong point remembered	5	2
3. Adequate provision for welfare		
<i>a.</i> Good home, clothes, etc.	22	7
<i>b.</i> Good education	5	2
<i>c.</i> Taught a skill or trade	13	4
	4	1
4. Good companionship and understanding	27	8
5. Good discipline, respect, obedience, etc.	96	28
6 Taught some ideal, character trait		
<i>a.</i> Directly by some teaching emphasis	156	46
(1) General moral ideals		
(2) To work and to help	24	7
(3) Self-reliance, independence, responsibility	27	8
(4) Honesty and truthfulness	25	7
(5) Miscellaneous ideals	17	5
<i>b.</i> Indirectly by example	15	4
(1) Good example in general	13	4
(2) Gentle, kind, patient	12	4
(3) Miscellaneous virtues	23	7
Total items	340	

Perhaps the most important memory of the grandfathers was their emphasis upon some ideal or trait of character in 46 per cent of the items. Some teaching emphasis was given in 32 per cent of the items and in the other 14 per cent of items the father was an example. Some comments were general, such as "grandfather gave us sound principles to live by"; but usually the specific trait was mentioned. Emphasis upon religious teaching was shown in such comments, as

"We always went to church three times on Sunday."

"There was no debate regards religious gatherings, we always went"

"His stick was the Golden Rule"

To work and to help was stressed in 8 per cent of the items with such typical comments as "*We had work, work, and then more work*". Some character traits were taught indirectly by example. Sometimes this example was spoken of in general terms and sometimes in specific terms. However, a given trait was usually mentioned only two or three times. This indicated the lack of any clear social pattern of the accepted rôle of the father in the home. The only group of traits mentioned over 10 times was that of gentleness, kindness, and patience. Two fathers were remembered for the strong point of "staying home nights."

A comparison of the weak and strong points of the grandfathers yielded some interesting points of difference and similarity. The statements of the weak points for the most part were longer and had some identifying phrase as if attached to rather specific memories. The following comments illustrated this

"He made the children afraid of him and let the last two get off easy in many ways"

"He let himself be dominated by the idiosyncrasies of his wife who did all the training and had all of the boys,"

"There was poor English in the family, so children speak poorly also"

"He wanted them to stay home and work on the farm"

"Older ones didn't get any allowance so did not have much training in financial responsibility"

"Too much was done for them, they were not allowed to get out of their own difficulties. They depended too much upon the family"

In contrast the strong points were usually shorter and more general like the following:

"Strict, the children must obey or else."

"Generous, gave to his children everything he could."

"Understanding of their problems"

"Truthfulness and honesty taught"

"Taught them the values of work and an orderly life."

After many years the weak points of the grandfathers were still connected with specific incidents of great tension. Fathers who hope their weak points will soon be forgotten, certainly hope in vain.

Comments for both weak and strong points of grandfathers showed no very clear social pattern of good fatherhood, although some lines of emphasis were indicated. Provision for the economic welfare of the child appeared to be taken for granted with only six to seven per cent of the items showing any extreme deviation. Of all the material provisions an education was felt most keenly. It was rather interesting that food, clothing, toys, and things in the home were so rarely recalled. This might reflect a sex difference in interest. It might reflect the fact that the grandfathers, like the fathers, had fairly good incomes. But nearly one-third of the group were unskilled laborers so that six to seven per cent was still a small emphasis upon material things. Since 24 per cent of the weak points mentioned indicated lack of companionship and understanding, and since only 8 per cent could give this as a strong point, the lack of such companionship was clearly realized. A well-established trend in the fatherhood pattern was that of good discipline and obedience. Grandfathers appeared to be weak in this in 32 per cent of the items mentioned and to be satisfactory in 28 per cent of the items. The fatherhood pattern apparently did not carry specific character traits as essential to it, but if the father emphasized such a trait, it was well remembered. Lack of poor teaching of some trait or ideal was considered a defect in only 17 per cent of items, but it was a positive point in 46 per cent of the items. Where the grandfather gave positive evidence in living or teaching of some trait of character, it was remembered. What traits he should have was not clearly patterned in the answers.

b. Attitudes toward their own paternal activities. At the end

of the questionnaire fathers were asked to state their own weak and strong points. Weak points were omitted by 36 fathers, and 7 others did not know of any weak point. Poor provision for the welfare of the children was mentioned 15 times or 5 per cent of weak points named; most of the items were lack of provision rather than a surplus. Too little time and companionship were mentioned 104 or 32 per cent of the items named. This criticism of themselves was interesting in view of the actual amount of time spent in the home by this group of fathers. Poor discipline and training were mentioned 95 or 30 per cent of the items, and only 3 per cent of this group thought they were too stern and strict. While spoiling and overindulgence were somewhat similar to lack of discipline, the two phrases occurred so often as separate criticisms that they were

TABLE 5
WEAK POINTS OF FATHERS' TRAINING

	Times mentioned	Per cent of times
1. Data incomplete on cases	36	11
<i>a</i> Data omitted	30	9
<i>b</i> Meaning not clear	6	2
2. No weak points known	7	2
3. Defect in provision for welfare	15	5
<i>a</i> Too much money, clothes, etc.	2	1
<i>b</i> Too little money, clothes, etc.	13	4
4. Defect in companionship, interest, etc.	104	32
<i>a</i> Little time and attention to children	56	17
<i>b</i> Lack of companionship, affection, etc.	46	14
<i>c</i> Dislike of children	2	1
5. Nature of discipline and training	95	30
<i>a</i> Spoiling and overindulgence	55	17
<i>b</i> Lack of discipline, easy, inconsistent	27	8
<i>c</i> Not cooperate with wife in discipline	3	1
<i>d</i> Too stern, too strict in discipline	10	3
6. Poor teaching of some ideal or character trait	65	20
<i>a</i> Directly by lack of teaching emphasis	11	3
<i>b</i> Indirectly by example		
(1) Poor example in general	6	2
(2) Bad temper and poor disposition	39	12
(3) Partiality, favoritism	4	1
(4) Miscellaneous defects	5	2
Total items	322	

listed separately. The fathers may have meant by spoiling the great ease of living and abundance of material things that their children had in comparison with their own childhood. Table 5 should be consulted for further data.

The criticism of poor teaching of some ideal directly or indirectly was somewhat smaller than might have been expected. This was mentioned 65 or 20 per cent of all items. Apparently the group of fathers had in mind no definite ideals that they felt under compulsion to teach their children. The most interesting item was the fact that 39 or 12 per cent of the fathers were conscious of their bad tempers and poor dispositions. These tempers probably reflected the generally tense financial condition of the last 10 years.

TABLE 6
STRONG POINTS OF FATHERS' TRAINING

	Times mentioned	Per cent of times
1. Data incomplete on cases	31	9
<i>a.</i> Data omitted	28	8
<i>b.</i> Meaning not clear	3	1
2. No strong point known	8	2
3. Good provision for welfare	41	12
<i>a.</i> Good home, money, education	37	11
<i>b.</i> Not overwork children	1	0
<i>c.</i> Taught a trade or skill	3	1
4. Companionship and affection	94	29
<i>a.</i> Understanding and companionship	66	20
<i>b.</i> Affection, consideration, kindness	28	9
5. Nature of discipline and training	37	11
<i>a.</i> Good discipline and obedience	35	10
<i>b.</i> Not too strict or stern	2	1
6. Taught some ideal, character trait	119	37
<i>a.</i> Directly by teaching emphasis		
(1) Sense of right and wrong	20	6
(2) Independence, responsibility, self-reliance	17	5
(3) Good intentions and effort to train well	19	6
(4) Effort to motivate children	9	3
<i>b.</i> Indirectly by example		
(1) Good example in general	25	8
(2) Broadminded, liberal, open to reason	9	3
(3) Miscellaneous virtues	20	6
Total items	330	

Strong points of fathers were omitted in 31 cases, and 8 fathers thought they had none. Good provision for the welfare of children was mentioned as a strong point 41 times or 12 per cent of the items. Companionship and affection was mentioned 94 times or 29 per cent of items. The two items listed in Table 6 were not sharply differentiated but were the terms used by persons interviewed. Only 37 or 11 per cent of the items mentioned good discipline and obedience as strong points. Good teaching of some ideals directly or indirectly was the strong point in 119 or 36 per cent of items. A general idea of what was right and wrong with good moral judgment was stressed in 6 per cent of items, while another 6 per cent named good intentions to train well as a strong point. Another 3 per cent referred to an effort to motivate children to make the most of their opportunities. The one group of traits fathers tried to teach was independence, self-reliance, and responsibility which were mentioned 17 times or 5 per cent. Indirect teaching by good example in general was named 25 times or 8 per cent. A miscellaneous group of traits were named 20 times or 6 per cent, for example tolerance, truth, thrift, patience, justice, humor, confidence, faithfulness and so on. It was to be regretted that so intelligent a group of fathers had such an indefinite idea of what character traits they wished to emphasize in their teaching.

A comparison of the fathers' weak and strong points gave the impression that fathers had not bothered to think very seriously about their rôle as a father. Few clear incidents were recalled in which subjects had weighed whether a good father would or would not have done this. Provision for material welfare was considered a weak point in only 5 per cent of items but increased to 12 per cent as a strong point. The fact that fathers considered lack of companionship as a defect in 32 per cent of items and as a strong point in 29 per cent, indicated that they were becoming alert and conscious of a need to participate in the social life of their children. This was certainly a wholesome emphasis in the father rôle. Discipline was considered defective in 30 per cent of items and a strong point in only 11 per cent. Did fathers remember their own "prompt obedience" to the grandfathers as they criticized their own discipline? Or was the new emphasis upon companionship incompatible with the former ideal of discipline? Teaching of some ideal directly or

indirectly was a weak point in 20 per cent of the items and a strong point in 36 per cent. Apparently fathers did not realize or subconsciously forgot their poor traits with the exception of their bad temper. An indefinite idea of what character traits fathers should emphasize probably accounted for the smaller number who recognized this as a weak point and for the varied traits that were mentioned as strong points. The fatherhood pattern indicated by the weak and strong points was one in which material provision was taken for granted, companionship and understanding were emphasized, discipline and obedience were decreasing in importance, and character traits were important but not evaluated.

c Comparison of attitudes of grandfathers and fathers. A comparison of the weak points of fathers and grandfathers yielded some interesting comparisons. Fathers were criticizing grandfathers in retrospect and themselves in the present. Lack of material provision was of about the same importance for fathers and grandfathers, 5 per cent for the former and 6 per cent for the latter. Lack of emphasis upon schooling and too much work were criticisms of grandfathers but not of fathers. Lack of time and companionship with children were weak points in grandfathers in 23 per cent of items and in fathers in 32 per cent of items. This might indicate a growing consciousness of the need for paternal comradeship. Discipline was a weak point in 32 per cent of the grandfathers' items and 30 per cent of the fathers'. Although the figures were quite similar the data showed several differences. The criticism of grandfathers never involved anything like "spoiling" and overindulgence while this was a frequent criticism of fathers' discipline. Grandfathers were more apt to be over strict and stern. Poor teaching of ideals or character traits was found in 17 per cent of grandfathers and 20 per cent of fathers. The most noteworthy item was the change in impatience and temper control from 3 per cent for the grandfathers to 12 per cent for the fathers. This might reflect economic tension and the shift from outdoor to indoor occupations. Narrowminded conservatism was a defect in 5 per cent of items about the grandfathers, while broadminded liberalism was a strong point in 3 per cent of fathers. Statements of weak points of grandfathers were rather long with a wealth of specific incidents while those of fathers themselves were short and general. This might

indicate that fathers need to develop greater sensitivity to the effect of their guidance upon the children.

A comparison of the strong points of grandfathers and fathers showed a significant increase in importance of provision for the material welfare from 7 to 12 per cent. This probably reflected the difficulty of economic conditions of the last decade. While good companionship and understanding were strong points in only 8 per cent of items concerning grandfathers, they became 29 per cent in fathers' estimates of themselves. Good discipline, respect, and obedience were 28 per cent of the items concerning grandfathers, they were 11 per cent of the fathers' good points. The ideal grandfather was a good disciplinarian meriting respect and obedience while the good father was one who had understanding companionship with his children. At the same time fathers had an uneasy conscience concerning their poor discipline and general spoiling as their weak points indicated. The teaching of some ideal or character trait was a strong point in 46 per cent of items concerning grandfathers and in 36 per cent of items concerning fathers. Perhaps the decrease in emphasis would not be so alarming were it not for the fact that certain fundamental virtues that grandfathers apparently stood for, tended to disappear in the fathers' estimates of essential character traits. For example, to work and to help which had 8 per cent emphasis in grandfathers' day did not appear in fathers' day. Honesty and truthfulness that had 5 per cent emphasis in the former generation were barely mentioned in this one. The traits of self-reliance and independence remained but had decreased. Many references to grandfathers were coupled with church activities and religion while fathers did not mention these at all in their own teachings. On the other hand, to be gentle, kind, and patient was a special trait to be mentioned in grandfathers' times, but this became an enlarged background for the expression of companionship and affection. There seemed to be both a gain and a loss from one generation to the other. Should companionship and understanding of children come with the loss of respect and obedience? Should the value of work and the importance of honesty and truthfulness be minimized in the present generation?

d *Attitudes of fathers toward mother's care of children* What is your chief criticism of the mother's care of small children? This

question was omitted by 16 or 5 per cent of fathers, 86 or 29 per cent said they had no criticism of the mother's care, 23 or 8 per cent mentioned some phrase of positive approval of the mother's care, and 175 or 58 per cent stated some disapproval of the mother's care. Thus 21 per cent more fathers disapproved than approved of maternal guidance.

An analysis of the 175 criticisms of mothers was made. Fathers thought 37 per cent of mothers were too easy, too lenient, and too lax in the enforcement of orders and requests. As one father stated, "*A few more spansks would have improved mother's discipline.*" The criticism of 27 per cent of fathers was that mothers babied, spoiled, petted, pampered, coddled, and waited on children too much. The term "babied" appeared frequently and this seemed to be somewhat different from slackness in discipline although the two might readily overlap. Seven per cent of mothers were too severe and too strict, 7 per cent scolded and nagged, 7 per cent were impatient with poor temper control, and 14 per cent gave miscellaneous reasons for their disapproval. Fathers thought mothers too easy in discipline and too generous in attention in two out of three of their criticisms.

e Attitudes of fathers toward children. Did you want children? Fathers wanted children in 99 per cent of the cases; in fact only 4 fathers out of 300 did not want them. While 75 per cent of fathers were satisfied with the number they had, 24 per cent desired more children. This question was omitted by one per cent of the group.

Do you prefer boys or girls? No preference for a given sex was expressed by 183 or 61 per cent, boys were preferred by 81 or 27 per cent and girls were preferred by 36 or 12 per cent of fathers. Various reasons were given for preferring boys. Twenty-six fathers thought they knew more about boys and could bring them up easier. Thirteen fathers thought boys would be more helpful and eleven thought they would be more fun. Only eight fathers wished to have sons to carry on the name or to follow in their footsteps. Four fathers wanted a little variation in their all-girl families but this was a small number out of the 68 all-girl families. One father thought a "modern daughter" would be far from a blessing. Some fathers gave no reason for preferring boys but 78 per cent did give a reason. The small number of fathers who preferred girls gave

various reasons. Ten fathers felt they understood girls better and could bring them up easier. Five fathers preferred girls because that was what they had. Strange as it may seem, one father preferred girls because they talked more. Only 56 per cent of the fathers who preferred girls gave some reasons for the preference. The quality of the reasons and the lower percentage of those giving reasons indicated that fathers were not too sure of a preference for girls.

Do you have a preference for one child? Fathers had no preference in 83 per cent of cases, but 50 or 17 per cent did have a preference. Fourteen fathers preferred the best natured and most helpful child. Seven fathers mentioned the youngest and seven others liked the child most like themselves. Five fathers liked the child who liked them best. Two fathers had a sex preference for the only boy in the family and for the "tomboy" in the all-girl family. On the whole fathers were relatively impartial in their affection.

Did children make your marriage happier? The question was omitted by 31 or 10 per cent of fathers. Only 12 or 4 per cent answered negatively, while 257 or 86 per cent answered affirmatively. Four of the fathers who did not want children cited economic reasons while the others cited various reasons. Of the 200 reasons mentioned to show that children made marriage happier, 33 per cent thought children gave them something to work for and to be proud of, 30 per cent thought children united the family with a steadying influence, 21 per cent thought children satisfied a natural desire, 13 per cent thought children made life interesting and brought back their youth, 3 per cent gave miscellaneous reasons, and one lone father wanted children for their work.

The fathers had very wholesome attitudes toward children. Almost all of them wanted children and for the most part they were happy with whatever they happened to have. A sex preference was shown by 39 per cent with more than a two to one preference for boys. Only one father in six showed a preference for an individual child. They believed children made their marriages happier in 86 per cent of cases. One father summarized the situation by saying, "*Children make our house a home*"

4 *Activities of Fathers in Bringing up the Children*

a. *Paternal guidance in early childhood during the first five years.*
Do fathers dream of a profession for their baby? In the group 18 or 6 per cent omitted this question, while 215 or 72 per cent did not plan ahead for their baby. Quite often fathers stated that the children should select the work they themselves wished. However 67 or 22 per cent did dream of some profession. Of those that had such a dream, 55 per cent wanted their children to have an occupation different from their own while 31 per cent wanted their children to follow in their footsteps. No preference for an occupation was stated by 13 per cent. The occupations in order of preference by seven or more fathers were teacher, doctor, lawyer, farmer, and musician.

What help did you give in the routine care of the baby? There were 14 or 5 per cent of fathers who omitted the question, 106 or 35 per cent who gave little or no care, 21 or 7 per cent who gave complete or "plenty" of care, and 159 or 53 per cent who named various routine activities they performed. Responses typical of the group giving little or no care were:

"Very little except to set a good example for them."

"Very little, consider that women's work"

"Very little, had to work too much,"

"Very little, had too much to do on the farm"

Answers classed as complete or much care were

"Did everything from changing their diapers to singing them to sleep. It was fairly frequent"

"Took care of middle child for first two years as wife was ill, almost all the care"

"Considerable care. Changed diapers, clothed and put to bed, fed. At least I did my share of it."

"Quite a bit as my wife was ill during the first six months and I had most of the routine care"

Illustrations of named activities were:

"Relieved wife when I had off-days and weekends and did the usual night pacing when necessary"

"Stayed with the child nights, fed him occasionally, put him to bed"

"Walked floor at night and did the spanking."

"Gave baths, changed diapers, walked floor, gave night bottle"

"Changed pants, bathed, fed formula, and amused baby"

"Minded the children when mother was busy"

Of the 159 who named activities, 11 per cent mentioned general care, 26 per cent named one activity, 30 per cent named two activities, 18 per cent named three, 11 per cent named four, and 4 per cent named five or more activities.

The 334 named activities were then classed into various types. There were 150 or 45 per cent daytime routine activities. Feeding or giving the bottle to the baby made up 21 per cent of these, dressing and undressing 11 per cent, bathing 11 per cent, and washing and ironing 2 per cent. Of the named activities, night care of various types was mentioned 98 or 29 per cent of the items mentioned. Putting to bed made up 10 per cent of the night activities, general night care 11 per cent, reading or singing to sleep 3 per cent, rocking the cradle 3 per cent, the usual floor walking 2 per cent, and one lone father heard the children say their prayers. Interestingly enough this father was not one of the several ministers interviewed in the study. Of the named activities 65 or 20 per cent fell under the heading of amusing the baby or "minding the baby" as many fathers expressed it. The last group of the named activities was care under special circumstances which was mentioned 21 or 6 per cent of times. This care was usually given when mothers or children were ill. Two fathers had the one important activity of weighing the baby on Sunday, while two other fathers were called in to give disagreeable medicine.

After fathers named their various activities in caring for the children, they were asked whether these activities were frequent or occasional. This question was omitted by 31 per cent. There were 33 per cent of fathers who took occasional care of the children and 37 per cent who performed these duties frequently.

Various factors seemed to determine how much care fathers gave to children. Some occupations kept the father away from the house most of the time. Some mothers were ill and fathers had to help. However, the amount of care seemed to be largely determined by the inclination of the father and the disinclination of the mother. Again and again fathers of the same occupation would be found giving

children in their homes no care or much care. How busy the father really was and how ill the mother might really be, could be greatly augmented by their disinclination to care for the child. Fathers who thought a great deal of their children, seemed to give considerable care regardless of their occupation. If they enjoyed their children, they made the time for them.

How did you play with the baby? Fathers checked a list of eight forms of play and then added any other forms not mentioned. Fathers checked trotting the child on the knee in 72 per cent of cases, lifting in the air in 71 per cent, carrying in public in 65 per cent, reading to the child in 65 per cent, carrying on the back in 64 per cent, playing peek-a-boo in 60 per cent, wheeling the baby carriage in 60 per cent and holding the baby at home in 51 per cent. Fathers did not add any other form of play in 53 per cent of cases. Going on walks and playing games were mentioned by 25 per cent, rough and tumble play by 5 per cent, stories and songs by 6 per cent, and miscellaneous forms by the others.

When fathers were asked whether this play was occasional or frequent, 67 or 22 per cent omitted the question, 56 or 19 per cent said it was occasional, and 177 or 59 per cent said it was frequent.

How did you tease small children? This question was omitted by 37 or 12 per cent of fathers, was answered negatively by 118 or 39 per cent, and was answered affirmatively by 145 or 48 per cent. Those fathers who teased, usually named several ways of doing it. Several fathers attempted to justify teasing by showing that it developed alertness and spirit in the sissy or retiring type of child. Many of the 39 per cent of fathers who thought they did not tease, probably did so. Some students interviewed their own fathers and found this to be true. In one case the father wrote a large "none" in answer to the question but his daughter amended with this comment,

"Father has forgotten. I was born in South Carolina. My father used to tell me that he found me in the rice fields, that I had been a pickaninny and that the black was still working out through my freckles"

The father did not recall the teasing but the daughter remembered the exact remarks some 15 years later. Fathers probably think that the child could not possibly believe the absurd remarks they make.

However, if the child did not accept these teasing statements as partially true, the fun of teasing would not exist. The inexperience of the child and its great faith in the parent enhanced the credulity.

Of the other 145 fathers who admitted teasing 18 failed to illustrate, however the others mentioned 151 forms of teasing. When these were classified on the basis of the underlying adult satisfaction, they did not appear to be very noble paternal activities. Physical contacts of various types, such as poking, punching, pulling curls, tweeking pigtailed, and tickling made up 31 per cent of teasing responses. Over half of the physical contacts were tickling, while a few rubbed their whiskers on the child and played get-its-nose. For the most part these were affectionate responses, a father's way of showing love. Unless the individual child resented such contacts, they were probably not harmful in any way. However, even these veined on an unpleasant paternal satisfaction in the bigness of papa. For example, one father stated, *"I pushed them playfully and I was too big for them to return it."* It is highly doubtful whether rubbing whiskers on the delicate face of a child inspired any great return of love.

Twenty-seven per cent of the forms of teasing involved activities dependent upon the discrepancy of size. The big father held something out of the reach of the small child, took some desired object from him, and hid his playthings. As a rule the one who had the fun in such activities was the father not the child. There would be no fun for the father unless the child felt thwarted and tried to recover his possession. The father usually ceased such activities when the child cried or fought in anger. The fathers usually pretended these activities taught the child spirit, but possibly they pampered to a greater extent the idea of their own bigness and power. At no age does a person like to have a possession snatched from his hands and held out of reach.

Another 15 per cent of the forms of teasing depended upon paternal lies. Unless the child half-believed and reacted as if he believed these lies, there would be no paternal satisfaction in their use as teasing devices. Part of these were just crazy tall stories which may have had fear motives as well, but there was no way of telling this from the statements. The other half were promises of ice cream, dresses, candy, and other things which the father had

no intention of getting or refusals of things that the parent really intended to give the child after a little tantalizing. One father "balled out" his children without cause just to hear them cry.

The fear motive was basic to another 15 per cent of teasing devices. About half of these were stories of burglars, bears, and other strange fear-inspiring things. With very small children the bee game sometimes furnished such a motive. The other half were threats to throw away or injure the child, such as make believe throw him into water, drop or throw from elevations. Sometimes they were threats of bringing home another child or of the parent's going away and leaving the child forever. In none of the fear threats cited, was there the slightest wholesome value in inspiring a sensible caution on the part of the child. The paternal satisfaction in these fear-inspiring actions must have been to get proof of the child's love and to enjoy its terrified effort to maintain paternal protection. Some of the sadistic element seemed to be present in this form of teasing.

Ridicule was the basis of 13 per cent of the forms of teasing. These represented nicknames as well as references to size and defects. Fathers no doubt liked the looks of the rosy plump little girls and the freckled snub-nosed little boys, but children interpreted references to these items of their appearance as unfavorable criticisms. Without such a childish interpretation, they would not be teasing devices.

Teasing probably represents one of the vices of fatherhood. The young child has few protective devices against teasing in the forms of projection, rationalization, and functional deafness. The young child over-evaluates the power and speech of the parent from its lack of comparative experiences. At no other time in its life does the child cope with so great a discrepancy in size. As a result of teasing, children practice oversensitiveness, inferior and angry reactions. Children outgrow father's teasing by getting a new evaluation of the truth of father's speech and power. When that time comes, he ceases to tease and in big boy fashion takes the credit for the change in his child's behavior. Meantime he has often laid a basis for inferiority, social timidity, and temper tantrums as well as produced hours of unhappiness for his child.

Did the small children bring their childish troubles to you or to

the mother? This question was omitted by 17 or 6 per cent while 94 or 31 per cent said the children brought troubles to both parents. Only 27 fathers or 9 per cent said children brought troubles to them while 159 or 53 per cent said children brought their troubles to the mothers. In 3 or 1 per cent of cases children brought their troubles to the maid or some other person in the home. In 22 of the 27 cases where children brought troubles to the father, the father was more understanding, more even in disposition, while the mother was nervous, sharp, and difficult. Of the 159 cases who brought their troubles to the mother, 56 or 42 per cent said the mother was more patient, sympathetic, understanding, and "babied more", 70 or 53 per cent said the father was away or too busy, and 7 or 5 per cent said the father was too stern and strict. In this connection two fathers made interesting comments "*Maybe I was at fault*" and "*I guess I wasn't patient enough with them.*" Of the 94 cases who brought troubles to both parents, various general factors were cited as responsible. For example the child took his troubles to the parent who was nearest at hand, to the parent with whom he was on better terms, and to the parent who was of the same sex. In addition to the general factors each parent had some specialty in type of problems. To father went problems of fixing toys, helping with school work, settling troubles with the neighbors, and handling extreme behavior problems. To mother went problems involving hurts, illness, and personal problems where children needed sympathy. When a child was in trouble, fathers had limited usefulness. This question showed very clearly that the children were much closer to the mothers than to the fathers in this study.

Did you and your wife disagree on ways to bring up the baby? Three or 1 per cent omitted this question, parents agreed in 184 or 61 per cent of cases, and parents disagreed more or less in 113 or 38 per cent of cases. Some of the favorable comments made by fathers were:

"Wife doing a swell job and I didn't know much about it"

"Wife had more training in those lines"

"She has pretty good judgment"

"We agreed mostly, or I was wrong"

"I would often be stubborn on minor points"

If the parents disagreed, the father usually mentioned at least two

reasons and often more than that. Of the 106 reasons cited for disagreement over bringing up the baby, 33 per cent thought mothers pampered and were too lenient in discipline; 22 per cent thought mothers were too strict, nagged and scolded; 12 per cent disagreed on time to discipline, 14 per cent thought mothers kept too strict routines for the child; and 19 per cent gave miscellaneous reasons. Out of the nine couples who disagreed on whether the baby should be picked up when it cried, six fathers and three mothers believed it should be picked up. Eight fathers insisted upon giving children candy and cake when mothers did not want them to do so. From the many small items mentioned, the impression was gained that the parents fundamentally disagreed in disposition and that the children served as pretexts rather than causes for disagreement. Perhaps it was surprising that there was so much agreement on an issue of such high affective value.

Did your wife leave the punishment of the children to you? Four or 1 per cent omitted the question. There were 34 or 11 per cent of mothers who usually left the punishment to the fathers, and 55 or 18 per cent who left it to him occasionally. To the credit of the mothers may it be said that 207 or 69 per cent gave the needed punishment themselves. Fathers were brought in for certain types of punishment, such as breaking the father's own possessions, disciplining the older children, checking very bad behaviors, settling problems involving people outside the family, and finishing off mothers' failures in discipline. Some of the comments of fathers were quite pertinent:

"When her punishment failed, children were sent to me."

"If it came to a spanking, I had to do it"

"Mother did most of the scolding and I had to do the spanking."

"It was father's job to take the boys to the woodshed"

"If mother couldn't make them mind, I did the punishing. She's softhearted and the child a boy."

But if there be any doubt in my reader's mind on whether all mothers were so softhearted, please note this remark, "*Mother whipped the boy every day but Sunday and he got two on Monday to make up.*"

How did you punish small children? This question was omitted

by 15 or 5 per cent, no punishment was given by 22 or 7 per cent of fathers, one or more forms were used by 263 or 88 per cent of fathers. Fathers did not use any great variation in punishment since 111 or 37 per cent fathers mentioned only one type, 115 or 38 per cent mentioned two types, 32 or 11 per cent named three types, 4 or 1 per cent spoke of four types, and only one father used five types. One father gave a fine illustration of the use of individual differences in punishment.

"Each of the nine children has a different means of punishment. One gets whipped, one gets fined ten cents, one is put to bed, one can't go to the movies, etc. Each one has the method that is most effective."

Fathers mentioned 454 forms of punishment which fell into the groups of verbal, physical contact, deprivation, and repayment. Verbal punishment was mentioned 74 times or 16 per cent. About half of the verbal forms were in the form of reasoning, explaining, and lecturing while the other half was in the form of scolding, shouts, and commands. "A good talking to" might involve any of the above verbal forms. Perhaps the chief difference was in the amount of parental emotion involved at the time. Punishment involved physical contacts in 168 or 37 per cent of the items. Of this group 146 were called spanking and whipping, 18 were named switching, slapping and paddling, and only four were pinching or shaking. Perhaps these groups of physical punishment should not be separated, but the comments indicated a slight difference in intensity of the punishment. Hairbrushes, magazines, straps, and hands were the usual props with switches either out of date or inaccessible. Deprivation was used in 205 or 45 per cent of all the items. Privileges, possessions, and favors were withdrawn in 84 or 41 per cent of the deprivations, movement was restricted by sitting in the corner or in a chair in 49 or 24 per cent, children were sent to bed with or without food in 37 or 18 per cent, children were isolated or confined in 32 or 16 per cent, and miscellaneous deprivations were used in 3 or 2 per cent of items. In only two cases was soap in the mouth used as punishment. Work or repayment was made a punishment in seven or 2 per cent of the total items. The popularity of deprivation probably depended upon the small outlay of paternal emotion.

Did you teach the baby new words? Did you answer the questions

of small children or hush them up? There were 243 or 81 per cent of fathers who did teach children new words, 48 or 16 per cent who did not teach them new words and nine or 3 per cent who omitted the question. Questions were answered by 230 or 77 per cent of fathers, they were hushed up by 37 or 12 per cent of fathers, and both procedures were used by 14 or 5 per cent of fathers. This question was omitted by 19 or 6 per cent of cases. Fathers made a real effort to contribute to the intellectual development of their children.

Paternal guidance in early childhood involved many activities. Only about one father in four dreamed of the future profession of his children. Nearly two out of three fathers helped in the routine care of the children during the day and the night with the two most common activities feeding the baby and "minding" the baby. Fifty-nine per cent of fathers frequently played with their children with the two most frequent forms of play, trotting on the knee and lifting in the air. Nearly half of the fathers teased their children with two-thirds of their methods based upon discrepancy of size, paternal lies, sadistic or fear motives, and ridicule. In about one family in ten, children brought their troubles exclusively to the father while children took troubles to both parents in one-third of the families. Parents agreed on ways to bring up the baby in 61 per cent of cases. Only 29 per cent of fathers had to give part or all of the punishment, mothers for the most part did this as the need arose. When fathers did punish, they used deprivation 45 per cent of time, physical punishment 37 per cent, and verbal forms 16 per cent. Fathers contributed to the intellectual development of their children by answering questions in 7 per cent of cases and teaching new words in 81 per cent of cases. Fathers made a very real contribution to the childhood of their children with the two weak spots shown in teasing and lack of confidence in times of trouble.

b. Guidance of older children from 6-12 years The questionnaire was designed to find out the amount and nature of guidance that fathers might give along economic, social, and intellectual lines during the latter part of childhood. There were 19 families or 6 per cent who had children too young for this age group.

Did you give the children any definite duties? The question was omitted for 20 or 7 per cent of the group, 40 or 13 per cent

gave no special duties to children, and 240 or 80 per cent gave the children duties of some type. Further analysis into the frequency of such duties showed that 7 per cent of this group did not name any duties, 25 per cent mentioned one or named a *general type*, 25 per cent mentioned two duties, 28 per cent mentioned three, 9 per cent mentioned four, and 7 per cent listed five or more duties. Most fathers then named three or less duties for the children in the home. Does this indicate there were only a few duties that such children could do or that parents did not bother to see that more duties were performed?

Fathers mentioned a total of 516 duties or tasks. From the nature of the tasks named, it was likely the fathers included the duties that the mothers had the children do. The item of general help with the housework was mentioned 57 times or 11 per cent. Activities in connection with meals, such as washing dishes, setting tables, emptying garbage, and so on were mentioned 113 times or 22 per cent of the total. Only three times was specific mention made of helping to prepare meals, perhaps mothers were lax in such teaching or else fathers did not know about such help. The most frequently mentioned activity in the whole series was washing dishes which occurred 87 times or 17 per cent of the total. Cleaning and keeping the house neat was mentioned 52 times or 10 per cent of the total with making beds mentioned 29 times. Personal help for members of the family was mentioned 23 or 5 per cent of the total with errands accounting for 19 of the items. Personal activities for themselves like care of clothing, pets, and playthings were mentioned 63 times or 12 per cent of the total with keeping their own room neat mentioned 28 times. Farm work and chores of feeding and milking were named 40 times or 8 per cent of the total. Garden and yard chores like cleaning walks and weeding were mentioned 79 or 15 per cent of the total with raking, mowing, and watering the lawn making up 39 of these. Household chores for boys, such as fixing the furnace, taking out ashes, burning papers, and washing windows were mentioned 58 times or 11 per cent, with getting wood or coal making up 28 of this group. Care of the car was mentioned only three times. A group of miscellaneous duties like delivering, selling papers, and other odd jobs were mentioned 28 times or 5 per cent. Some of the interesting comments of fathers were as follows:

"Hell, yes! the trouble with this generation is no responsibility."

"No, it was hard to find things for them to do when you were living in a New York apartment"

"The oldest boy cares for the cows and chickens, the next boy the dog and rabbit, both weed the garden and mow the lawn."

"Believe they should but have not made duties definite"

"Yes, they have duties but they don't do them"

The number of duties mentioned was definitely related to the location of the home. Most of those who mentioned three to five activities, were on farms but some in the city did find many duties for the children. Perhaps the alertness of parents to find suitable duties and the patience to develop a sense of responsibility in their performance was as important as the environment. On the farm fathers actually needed the help of the children. In the city fathers did not mind doing the odd jobs about the house for their own exercise.

Did children work outside of the home at your suggestion? Did you share in this earning? This item was overlooked or omitted by 30 or 10 per cent, was answered affirmatively by 75 or 25 per cent, and was answered negatively by 195 or 65 per cent. Usually the father added the fact that the children themselves desired to work outside the home. Only four or 1 per cent of fathers shared in what the children earned while 139 or 46 per cent definitely said they did not share in this earning. The fathers had sufficient income in most cases so such work, even if it could have been found, was not necessary for these children.

Do you give the children an allowance or give them as they ask? This question was omitted by 26 or 9 per cent. There were 113 or 38 per cent of fathers who gave an allowance, 144 or 48 per cent who gave money when asked, and 12 or 4 per cent who combined the two methods. Only five or 2 per cent said children had only what money they earned. Two interesting comments were: "*I gave them all they earn*" and "*I gave them nothing, nine children I can't.*" There was a tendency to give the girls and younger children as they asked for money while boys and older children had allowances. Varying amounts were mentioned as allowances. For small children the weekly sum of 5 cents was mentioned four times,

10 cents mentioned 16 times, 25 cents named 40 times, and a maximum of 50 cents mentioned twice. For older children 50 cents was mentioned 19 times, one dollar named 16 times, two dollars mentioned twice, and a maximum of five dollars mentioned once. About two fathers in ten provided for this important training in the budgeting and use of money.

What games or play did you have with children 6 to 12 years of age? Data on this question was omitted for 42 or 14 per cent of fathers. There were 24 or 8 per cent of fathers who had no play and 234 or 78 per cent who played with the older children. One play activity was mentioned by 41 or 14 per cent of fathers, two play activities by 49 or 16 per cent, three forms by 61 or 20 per cent, four forms by 38 or 13 per cent, five forms by 25 or 8 per cent, and six or more activities by 20 or 7 per cent.

The fathers mentioned 656 games and sports. Of these activities there were 373 or 57 per cent outdoor forms, 216 or 33 per cent indoor forms, and 67 or 10 per cent miscellaneous forms. Of the outdoor games, those played with balls were most popular and were named 168 or 26 per cent of the total while summer recreations like picnics, camping, fishing, hunting, hiking and so on made up 108 or 16 per cent. The indoor games were about equally divided between card games and various board games like checkers, chess, and others.

Are you a pal to the girls? To the boys? This question was omitted by 29 or 10 per cent of fathers. There were 123 or 41 per cent of fathers who thought they were pals to both boys and girls. There were 50 or 17 per cent of fathers who were pals to girls only but 43 of these had no sons. There were 45 or 15 per cent of fathers who were pals to boys only but 22 of these had no girls in the family. Only 53 or 18 per cent felt they were not pals to their children and of this group 38 had both boys and girls, 4 had only sons and 11 had only girls.

The sex factor apparently affected the relationships. While there were 32 fathers with or without sons who weren't pals to their daughters, there were only 11 fathers with or without girls who weren't pals to their sons. There were only seven fathers who were pals with the girls but not to the boys while there were 23 fathers who were pals to the boys but not to the girls. Quite a few fathers

specifically stated that they wished they knew their daughters better. The amount of play with the children also affected the amount of comradeship. Almost all the fathers who felt they were not pals to their children, did not mention any form of play with them.

When do you punish children of 6 to 12 years? The question probably should have read "under what circumstances," for 59 or 20 per cent answered it with the phrase "when they need it" or "soon after the offense." The question was omitted by 55 cases or 18 per cent. There were 32 or 11 per cent of fathers who never or very rarely punished their children of this age. The other 209 or 70 per cent of fathers mentioned one or more situations under which they punished these older children. Thus one situation was named by 81 or 27 per cent, two situations by 53 or 18 per cent, three by 14 or 5 per cent, and four or more situations by one per cent. Samples of fathers' comments on this question were as follows.

"So well broke they don't need punishment. One yell is enough."

"When I get aggravated by them."

"Smoking, cursing, unnecessary noise, breaking things and persistent requests."

The last father quoted must have been quite busy with his four boys and so many occasions for punishment.

Fathers named 247 responses for which they punished. The largest single item was disobedience, mentioned 118 times or 48 per cent. In this connection it is well to recall that 30 per cent of fathers thought their own weak point was discipline and that 37 per cent of criticisms of the mothers concerned leniency in discipline. Other occasions for punishment were disrespect and impudence named 27 times or 11 per cent, naughty and mischievous 22 times or 9 per cent, quarreling and fighting 16 times or 7 per cent, lying 16 times or 7 per cent, failure in routine duties 11 times or 5 per cent, stealing 8 times or 3 per cent, breaking things 7 times or 3 per cent, and cursing 6 times or 2 per cent. There were 16 miscellaneous items or 7 per cent.

How did you punish children of 6 to 12 years? The question was omitted for 52 or 17 per cent of fathers. Only 16 or 5 per cent said they never punished, while 232 or 77 per cent named one

or more methods of punishment. There was a tendency for a father to utilize a single type of punishment. Only one method was mentioned by 46 or 49 per cent, two methods by 73 or 24 per cent, and three methods by 13 or 4 per cent.

The fathers mentioned the use of 352 forms of punishment. Deprivation of various types were mentioned 177 times or 50 per cent of the total. Deprivation of amusements like movies was named 19 times, deprivation of allowance 14 times, going to bed early 14 times, and loss of some food 4 times. Verbal punishment through scolding, reasoning, and talking was named 97 times or 28 per cent of all with two fathers using silence as punishment. Some physical punishment like spanking, whipping, and strapping was named 64 times or 18 per cent of the total, with slapping and boxing the ears mentioned only 7 times. Work and repayment were mentioned 12 times or 3 per cent of the total.

A comparison of the forms of punishment used in early and late childhood showed similarities and differences. At the early level 37 per cent of fathers used one type only, and at the later age 49 per cent used only one type. Deprivation in early childhood made up 45 per cent of forms, and in later childhood 50 per cent. Verbal punishment had been 16 per cent at the earlier level and became 28 per cent at the later level. Physical punishment at the early level was 37 per cent and at the later level 18 per cent. Work or repayment at the early level 2 per cent and at the later level 3 per cent. The two most characteristic changes was decrease of physical and increase of verbal forms of punishment. Deprivation of movement in early childhood meant sitting in a chair or corner and at the later level, staying home nights.

Do you help with school work? The question was omitted by 26 or 9 per cent of cases. Tutoring was left to the mother by 14 or 5 per cent of fathers. There were 70 or 23 per cent of fathers who gave no help with school work, while 190 or 63 per cent gave more or less help. Arithmetic or mathematics was mentioned 30 times, geography 5 times, spelling 5 times, history 5 times, and reading once. One father helped for a week after getting report cards. Several fathers said they had to stop helping as they had so much argument over their unusual methods which differed from the teacher's.

Fathers gave considerable paternal guidance in late childhood from 6 to 12 years. From an economic standpoint there was some effort to teach the value of work through home duties and outside work. Although 80 per cent of fathers gave duties in the home, they named three or less specific duties in about three-fourths of the cases. They were apparently alert to the need of such duties in training for responsibility but probably did not give sufficient practice in the few duties mentioned. Washing dishes made up 17 per cent of the named duties. About 25 per cent of fathers encouraged children in getting work outside of the home with only 1 per cent sharing such earning. Some training in the use of money was given by the 38 per cent of fathers who gave children regular allowances. Fathers shared in the children's social life as well. Only 8 per cent of fathers did not play at all with children, while 78 per cent played with the children usually in outdoor games involving physical activity. Only 18 per cent of fathers were not pals to their children, while the other 72 per cent were pals to one or both sexes in the family. As a part of their social training 70 per cent of fathers used some sort of punishment which was either deprivation or verbal remarks three-fourths of the time. Fathers manifested intellectual interest in school work by helping children with homework in 63 per cent of cases.

c Guidance at adolescence from 14 to 21 years. Questions concerning this period of youth attempted to find out what social and intellectual guidance fathers gave. There were 53 fathers in the study who had no children of this age. Only a few questions could be included.

Do you give sex instructions at this age? Data was omitted for 63 or 21 per cent of the group. The mother gave such information in 21 or 7 per cent of cases. There were 112 or 37 per cent of fathers who gave such instruction, and 104 or 35 per cent who did not give any. Quite a number said they had started such instruction at an earlier age.

Do you guide in the selection of boy and girl friends? The question was omitted by 58 or 19 per cent of fathers. Of the remaining fathers 148 or 49 per cent gave some guidance, while 94 or 31 per cent did not do so. There were 110 methods mentioned by which fathers gave social guidance in selection of friends. About

6 per cent made positive effort to point out the good points of associates and have good friends with their young people, while 5 per cent actively forbade their going out with undesirable companions. The other 71 per cent definitely influenced the selection of friends either subtly in the case of 31 per cent of these or frankly by discussing the good and bad points in the case of the other 40 per cent. One father showed considerable patience in the following comment: *"Yes, I had a couple of uncompoops chasing the older girls. I found jobs for them around home until the girls were sick of seeing them but I nearly went crazy."*

Do you expect these young people to be obedient? The question was omitted by 57 or 19 per cent. Only 13 or 4 per cent of fathers did not expect them to be obedient while 230 or 77 per cent expected some amount of obedience.

Only 62 fathers gave some qualifying phrase with regard to this answer. Of these, two fathers expected complete obedience, 44 some obedience within reason, 9 expected obedience as long as they supported the child, and 7 thought children should be respectful of parental wishes. Comments of fathers were pertinent:

"Yes, they have to be obedient all their life"

"I can always hope"

"No use of expecting anything like obedience"

"They owe it to their parents and themselves"

"Obedience because I still pay the bills"

"I give them commands they are apt to obey"

"I don't ask too much of them."

Do you encourage your young people to stay in school? There were 56 or 19 per cent of cases who omitted this question. Only 9 or 3 per cent of fathers did not encourage their children to stay in school, while 235 or 78 per cent definitely urged children to remain in school. The words used in many answers indicated a feeling of great importance attached to an education.

During adolescence fathers continued some supervision of their young people. Scarcely half of the fathers reporting, gave any sex instruction to their young people at any time. About five fathers out of eight tried to influence and guide the selection of friends by their young people. Of the fathers answering, all but 4 per cent expected their young people to show some obedience to paternal

wishes, that is, within reason. All the fathers with the exception of 3 per cent encouraged their young people to continue their education.

E. SUMMARY AND CONCLUSIONS

This investigation of the attitudes and activities of 300 fathers was based upon interviews with a set of 50 questions.

More than half of the fathers were between 40 and 60 years of age. They were largely professional and businessmen with only one-third semi-skilled or unskilled laborers. At least 53 per cent of them had had some training beyond high school. The fathers usually spent three or more hours in the home weekdays and most of Saturday and Sunday. Considering the age, occupation, education, and time at home these fathers should represent fatherhood at its best.

Only 10 per cent of the mothers worked outside of the home to earn money. The 874 children were in families of one to three children in 75 per cent of cases and in families of one or two in 49 per cent of cases. There were children of one to five years in 19 per cent of families, children of 6 to 14 years in 46 per cent of families, and children of 15 or more years in 70 per cent of families. There were 37 per cent of families with children of a single sex. There were 59 more girls than boys.

The fathers stated criticisms of their own fathers. The grandfathers' weak points were remembered for 6 per cent of defects in provision for welfare, 24 per cent defects in companionship, 32 per cent defects in nature of discipline, and 17 per cent defects in poor teaching of character traits. The grandfathers' strong points were remembered as provision for welfare in 7 per cent of items, good companionship in 8 per cent, good discipline in 28 per cent, and good teaching of some character trait or ideal in 46 per cent of items.

The fathers estimated their own weaknesses as 5 per cent defects in provision for welfare, 32 per cent defects in companionship, 30 per cent defects in discipline, and 20 per cent defects in poor teaching of character traits. Fathers estimated their strong points as good provision for welfare in 12 per cent, good companionship in 29 per cent, good discipline in 11 per cent, and good teaching of some character trait in 36 per cent of items.

Although 29 per cent of fathers offered no criticism of mothers,

there were 58 per cent who disapproved of her leniency in discipline and general spoiling of children.

There were 99 per cent of fathers who wanted children and 24 per cent who wanted more children. Although 61 per cent had no sex preference, 27 per cent preferred boys and 11 per cent preferred girls. Only 17 per cent of fathers had specific preference for a given child. Only 4 per cent of fathers felt children had not made their marriage happier.

The guidance of fathers was separated into early childhood, late childhood, and the adolescent period.

In early childhood 22 per cent of fathers dream of some profession for their babies, usually something different from their own. There were 60 per cent of fathers who gave some routine care to the young children with the two largest items, feeding and amusing the baby. Fathers had many forms of play activities with young children. At least 48 per cent of fathers teased their children in rather unwholesome ways two-thirds of the time. Children took their troubles to both parents in 31 per cent of cases, to mothers in 53 per cent, and to fathers in only 9 per cent. The parents agreed in bringing up the child in 61 per cent of cases, and disagreed in 38 per cent with the most of the disagreements concerning the pampering and leniency or the strictness, nagging, and scolding of mothers. Mothers left punishment to fathers habitually or occasionally in only 29 per cent of cases. Fathers punished small children by deprivation in 45 per cent of the items, by physical methods in 37 per cent, and by verbal forms in 16 per cent. Intellectual help was furnished by 81 per cent of fathers who taught the children new words, and 77 per cent who tried to answer childish questions.

Guidance of older children from 6 to 12 years was along economic, social, and intellectual lines. Children were given duties about the house in 80 per cent of cases, but only three or less duties were usually mentioned. In only 25 per cent of families were children encouraged to work outside the home. There were 38 per cent of fathers who gave allowances to their children. While 8 per cent of fathers did not play with these older children, 78 per cent of them did play many outdoor games involving physical activity. The fathers felt they were pals to their children in 72 per cent of cases. Various forms of punishment were used with these

older children by 70 per cent of fathers. Deprivation was used in 50 per cent of forms, verbal methods in 28 per cent, and physical methods in 18 per cent. These older children were punished for disobedience in 48 per cent of the times mentioned. There were 63 per cent of fathers who gave more or less help with school work.

During the adolescent period there was some social and intellectual guidance given by fathers. Only 37 per cent of fathers gave any sex training or instruction. There were 49 per cent of fathers who influenced the selection of friends more or less directly. This older group was expected to be somewhat obedient by 77 per cent of fathers. With the exception of 3 per cent, the fathers encouraged their young people to continue their education.

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STORIES THAT ARE LIKED BY YOUNG CHILDREN*

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A SOURCE OF THE DATA

The data of this report were obtained from nine groups of subjects, as follows:

1. Eighty-three boys and 80 girls in the kindergarten and first grade of a New York City public school, located in a less favored community. A large proportion of the children were of Italian descent, a few were negroes, and the others were white of varied descent. Each of these children was asked individually to tell what stories he or she liked very much. Trained interviewers were used, good rapport was established in almost every case, and in general the children seemed to respond willingly and spontaneously.

2. Fifty-two boys and 57 girls from the Hunter College Elementary School kindergarten and first grades. These children were from homes generally classified in the upper brackets of income, and most of them enjoyed superior privileges. These children were also interviewed individually.

3. Three hundred and seventeen boys and 330 girls of two New York City Junior High Schools in Grade 9B. The schools were co-educational and in better than average socio-economic sections of the city. These children answered a questionnaire of four items. The first item was a request for the names of stories they remembered about from early childhood reading up to about the third grade. The other three questions did not enter into this report.

4. Eighty-three girls in the second term of Hunter College High School, who answered the same questions as did the junior high school pupils. These students had been admitted to the high school on competitive examination and most of them were definitely of superior mental ability. Their socio-economic background was not as privileged, perhaps, as that of the elementary school children of the college.

*Received in the Editorial Office on October 29, 1941

5. One hundred and twenty-two Hunter College upper division young women filled in a somewhat longer questionnaire, in which was a request for the names of stories read in early childhood which the students now felt were the most important ones. Students are admitted to Hunter College on the basis of average Regents examination marks, and so are mentally quite highly selected. Socio-economic background, however, is not exceptionally privileged in most cases.

6. One hundred and fifty-two parents of children enrolled in the kindergarten and first and second grades of the Hunter College Elementary School gave the names of books owned by their children attending these grades. This reply was obtained two or three years before the children of the school, described in (2) above, were interviewed, and so in most cases the parents were not mothers of the children interviewed. The type of home and child contributing to the school did not materially change during the two or three years intervening, however.

The replies of all subjects, excepting the parents, were tabulated for the first five books or stories named, only. Inspection of papers in regard to another question asking for the name of the story liked best of all or considered the most important one, indicated that in the great majority of cases the first five stories named included the favorite stories or those considered the most important.

B TREATMENT OF THE DATA

It was necessary, because of the great number of stories named, to reduce the clerical work as far as it seemed not to distort the findings. Accordingly one list was made up of all stories most frequently named. To make the data comparable it was further necessary, since there were varying numbers of subjects in the various groups, to equate the number of times titles were given by some common denominator. The number 320 was arbitrarily chosen because of its convenience, since it gave small numbers to use as multipliers, viz.: for each junior high school group, 1 (no change); for the two public school and the Hunter College High School groups, 4 each; for the parent group, 2.1; for the Hunter College group, 2.6, and for the Hunter Elementary School, 6.1 and 5.7, respectively.

If the data of this report were to be treated in a thoroughly statistical manner there would be serious objections to the equating technique employed. The data, however, are too few and too inexact to be treated numerically in any but a very rough way to indicate general trends. Only broad conclusions are to be drawn.

C ANALYSIS

Table 1 gives the 120 titles named at least 10 times by any one

TABLE 1
THE 120 STORIES NAMED 10 TIMES OR MORE (EQUATED SCORES) BY THE NINE GROUPS

True No of subj	P. S.		H E S		J H S		H I S. H C		Par.	Total
	83	80	52	57	317	333	83	122	152	
Titles	B	G	B	G	B	G	G	G		
About Things									12	12
Adventure,										
Books of									46	46
Aesop's Fables					64	26	24	16		130
Airplane	12									12
Aladdin					14	12				26
Alphabet										
Books									21	21
Ali Baba					14					14
Alice in										
Wonderland				23	11	21	36	47	50	188
Animal										
Stories	56	48							10	114
Art Series										
for little										
Children									13	13
Arabian										
Nights					14			13		27
Baby Who										
Needed Milk			12							12
Barbar Books									48	48
Barefoot Abe			31							31
Bible Stories				17				18	57	92
Beauty and										
The Beast					10	15				25
Black Beauty							16	21		37
Bobbsey Twins				11		18	32	118	17	178
Book of										
Knowledge								16	23	39
Buddy and										
Floating										
Island			12							12
Cat	16									16
Child's Garden										
of Verses					17	11	24	10	90	152

TABLE 1 (continued)

True No of subj. Titles	P S		H E S		J H S		H. H. S		H C.	Par	Total
	83	80	52	57	317	333	83	122			
	B	G	B	G	B	G	G	G			
Children of Other Lands										30	30
Christmas Carol								13			13
Cinderella	12	36		17	58	131	118			27	399
Circus			24	23							47
Delicia										10	10
Dickey Dare						10	20				30
Dog	20										20
Donkey-Donkey										10	10
Dr. Doolittle					13			16			29
Elsie											
Dinsmore											
Fairy-Tales					54	112		26		103	26
Ferdinand								203			472
the Bull			12	11						55	78
Five Little Peppers											
General								10		10	20
George the Great			12								
Ginger											12
Gingerbread										10	10
Boy	28	16	24	11	35	26	20			10	170
Gulliver's Travels			24		15						29
Hans Brinker											10
Hansel and Gretel					39	40	48	10		10	137
Here and Now Book											
Heidi										13	13
Home Uni- versity							32	78		38	148
Bookshelf											
Honey Bear										13	13
Honey Bunch										17	17
House in the Woods								26			26
In the Park				11							11
Iron Stove			12								12
Jack and the Beanstalk				11							11
Jack the Giant Killer					83	58	36				177
Junket is Nice					15						15
Just-So Stories										13	13
Little Black Sambo										17	17
Little Lame Prince			37	40	41	24	48			10	230
						12		16			28

TABLE 1 (continued)

True No of subj Titles	P S		H E S		J. H S		H C	Pa	Total
	83	80	52	57	317	333			
	B	G	B	G	B	G	G	G	
Little Men							44		44
Little Old Nickle			18	23					41
Little One-Eye, etc							16		16
Little Red Handkerchief			18	17				11	35
Little Red Hen			18						29
Little Red Rid- ing Hood	36	72	24	34	160	158	112	107	596
Little Women									107
Manners Can Be Fun								13	13
Marjorie Dean								10	10
Mary Poppin's Books								23	23
Mickey Mouse	16		18					27	61
Milne's Books								121	121
Monkey and Hat			31	11					42
Mother Goose	100	100	12		193	115	84	13	697
Nobody's Boy								16	16
Old Fashioned Girl								13	13
Outdoor Fun			12						12
Outdoor Girls								16	16
Overall Boys						11			11
Patsy Ann								11	11
Peter Ann						14	12	25	51
Peter Pan									
Peter and Peggy Stories						11			11
Peter and Polly Books						14		16	30
Peter Rabbit	12		24	34	24	16	28	25	163
Ping								13	13
Pinochio	56	32	91	23	90	52	56	36	503
Pollyanna								10	10
Pony			24	23					47
Porridge Pot						10			10
Puss In Boots						11			11
Raggedy Ann Stories								33	33
Return of St Nicholas				11					11
Ride, A			12					10	12
Robin Hood								10	10
Seamen's Series								13	13
Secret Garden									
Sleeping Beauty					24	40	32		96

TABLE 1 (continued)

True No of subj. Titles	P. S.		H. E. S.		J. H. S.		H. H. S.		H. C.	Par. 152	Total
	83 B	80 G	52 B	57 G	317 B	333 G	83 G	122 G			
Smiling Hill Farm				17							17
Snow			18	17							35
Snow Queen						10					10
Snow White and Rose Red					16	20	7				64
Snow White and Seven Dwarfs	12	24	18	40	22	37	16			86	255
Star Dollars			12								12
Story of Clothes										13	13
Story of Tins										16	16
Sunbonnet Twins						27					27
Tar Baby				17							17
Teenie and the Old Man										16	16
Teenie Tiny Woman				11							11
Three Bears	60	144	24	91	192	154	114			13	792
Three Billy Goats	16	12									28
Three Little Kittens				11						21	32
Three Pigs	20	72	37	74	105	38	16			21	383
Told Under the Blue Umbrella										18	18
Tom Sawyer								13			13
Tom Thumb					10						10
Toto and Little Chicks				11							11
Twin Book Series							12	18			30
Two Boats			18								18
Uncle Remus							12				12
Uncle Wiggley				11			28			23	62
Wee Gelles			12								12
Wee Mousey			24	28							52
What Am I										15	15
Wizard of Oz			24	40	13		16			18	116
Wolf and Seven Kids				11							11
Total Number of titles											
given—120	13	10	31	31	27	31	27	32	50		120
Number of titles given by primary children omitted by others						33	29	33	28		
Number of titles given by others, omitted by primary children						24	14	28	31		
Number of titles given by primary children and others						14	13	5	19		

or more of the groups, according to the equated figures. Study of this table suggests the following observations:

1. A wide variety of material, classics, modern, fanciful, real life, educational, and other literature.

2. Many titles, especially by high school and college students, for stories probably read during middle or later childhood, rather than early childhood, as defined in the study.

3. Of the 120 titles, 50 were named by parents. The Hunter Elementary School, the junior high schools, and the Hunter College High School groups each named about the same number, 27-32. The public school children named many fewer—13 by the boys and 10 by the girls.

4. The junior high school students gave 24 stories not given by any of the primary children's groups. The Hunter College High School students named 14 such, the college students 28, and the parents 31.

5. The combined junior high school groups, the Hunter College High School, the Hunter College and parent groups omitted, respectively, 33, 29, 33, and 28, of the titles given by one or more of the primary children's groups. These apparent omissions were due in some small part, no doubt, to inexactness or variation in naming stories. For example, the college girls gave an equated total of 203 for fairy tales, and did not name specifically *Cinderella*, *Little Red Riding Hood* and others, which they doubtless classed in their minds as fairy stories. On the other hand the primary grade children named many individual fairy stories.

6. The four older groups named above in (5) gave respectively, 14, 13, 5, and 19 titles which were given also by one or more of the primary children's groups. The Hunter College students showed the greatest variation from the primary children, naming (by equated scores of at least 10) only five of the stories given by the primary children.

7. Many stories that were named indicated some recent reading experiences, such as class reading or story telling, for example, *Little Old Nickel*, as shown by the Hunter Elementary School group.

8. There were very many titles mentioned a small number of times by one group only, and many others by two groups only.

TABLE 2
THE 21 MOST POPULAR STORIES MENTIONED 100 TIMES OR MORE (EQUATED SCORES)*

Stories	P S.		H C E S.		Jr	H S		H H S.		H L C		Par.	Total
	B	G	B	G		B	G	B	G	B	G		
Three Bears	60	144	24	91	192	154	114	0	0	13	792		
Mother Goose	100	100	12	6	193	115	84	13	13	80	703		
Little Red Riding Hood	36	72	24	34	160	158	112	0	0	8	604		
Pinochio	56	32	91	23	90	52	56	36	36	67	503		
Cinderella	12	36	0	17	65	131	118	5	5	27	404		
Three Pigs	20	72	37	74	105	38	16	0	0	21	383		
Snow White	12	24	18	40	94	22	37	16	0	0	255		
Little Black Sambo	8	4	37	40	89	41	48	5	5	40	247		
Alice in Wonderland	0	4	6	25	27	11	36	47	47	50	192		
Jack and the Beanstalk	4	4	0	0	8	58	36	0	0	0	185		
Bobsey Twins	0	0	0	11	11	18	32	118	118	17	179		
Gingerbread Boy	28	16	24	11	79	35	26	0	0	10	170		
Peter Rabbit	12	4	24	34	74	24	16	28	3	25	170		
Heidi	0	4	0	0	4	1	3	32	78	58	156		
Child's Garden of Verses	0	0	0	0	0	17	11	24	10	90	152		
Hansel and Gretel	4	4	0	6	14	39	40	48	0	10	151		
Milne's Books	0	0	6	11	17	1	0	0	3	121	142		
Aesop's Fables	0	0	0	0	0	64	26	24	16	8	158		
Wizard of Oz	0	4	24	40	68	13	2	16	5	18	127		
Little Women	0	0	0	0	0	5	0	0	107	2	114		
Bible Stories	0	8	0	17	25	0	0	0	13	57	100		
Total stories named—21	12	16	12	16	18	19	19	18	14	20	21		

*In this table the number of choices less than 10 (equated scores) has been shown, in order to make the table more nearly representative of the data secured from all of the groups. In Table 1 only equated numbers of 10 or more are shown

Perhaps some special factor connected with such groups would explain such choices.

Table 2 shows the frequency of choice (by equated numbers) of the 21 titles which were given by all groups together at least 100 times. The list is arranged in order of these totals and also shows the figures for each of the various grade levels. Several observations are of interest

1. Old favorites were at the top of the list, with the two recently movie made tales of *Pinocchio*, *Snow White and the Seven Dwarfs*. The remainder of the titles were largely those of the more popular and less traditional stories, such as *Little Black Sambo*, *Peter Rabbit*, Milne's stories and a few other traditional ones, such as *Jack and the Beanstalk*, *Hansel and Gretel*, and Aesop's fables. Bible stories were named just 100 times on the equated scale, and are at the bottom of this list

2. Of the 21, each group of primary grade boys named 12 and each group of primary girls named 16, although there was some variation in the stories mentioned.

3. The junior and senior high school groups named 19 and 18, respectively, while the parents named 20. The one story not named by the parents, *Jack and the Beanstalk*, was probably included in one or another collection of stories named otherwise by the parents.

4. The college group did not name seven of the 21 most popular stories. The titles most frequently named by them were those not given by any primary children's group, or mentioned only a few times by them, such as *Bobbsey Twins*, *Little Women* and *Heidi*. Possibly these college students, since they were brighter than average, did actually read these more mature stories when they were young children, although average primary grade children generally do not care for them.

5. The most popular stories named by the public school children were the more traditional ones.

6. More of the Hunter Elementary School children named recent children's literature than did the public school children, for example *Little Black Sambo*, *Peter Rabbit*, *Wizard of Oz* and the Milne books.

7. Sex differences in preferences among the primary children were clear and consistent in both the public school and the Hunter

Elementary School groups, being apparently as follows: girls preferred *The Three Bears*, *Three Pigs*, *Cinderella*, *Wizard of Oz*, and *Snow White*; while the boys showed preference for *Pinocchio*, *The Gingerbread Boy*, and *Mickey Mouse*. In addition, the Hunter Elementary School girls, but not boys, named Bible stories; and the boys of that group, but not the girls, named *Barefoot Abe* and *Gulliver's Travels*. In general it seems that among these children of both schools the boys tended to prefer more than the girls the more robust and perhaps the more mature type of story, while the girls more than the boys preferred the more fanciful and less mature type of story.

8. The totals for the four primary grade groups all together, gave quite a different order of popularity from that of the older groups, except that *The Three Bears* remained distinctly first choice, and *Mother Goose* second.

Table 3 presents comparatively the stories named by parents and

TABLE 3
ANALYSIS OF STORIES NAMED 10 TIMES OR MORE (EQUATED SCORES) BY THE PARENTS AND BY THE PRIMARY CHILDREN

Titles	Times named		Nature of stories		
	Boys	Girls	Educational Misc	For enjoyment People Animal Others	
<i>Part A Titles Given By Primary Children But Not By Parents</i>					
Airplane	12		12		
Baby Who Needs Milk	12			12	
Barefoot Abe	31			31	
Buddy and Floating Island	12				
Circus	24	23			12
General George	12			47	
Gulliver's Travels	24		12		
House in Woods		11	24		
Iron Stove		11			11
In the Park	12				11
Little Old Nickle	18	23			12
Little Red					41
Handkerchief	18	17			
Little Red Riding Hood					35
Monkey and Hat	60	106			
Outdoor Fun	31	11			166
Pony	12			42	
Return of St. Nicholas	24	23		47	12
Ride, A		11			11
Smiling Hill Farm	12				12
		17			17

TABLE 3 (continued)

Titles	Times named		Nature of stories			
	Boys	Girls	Misc	Educational People	For enjoyment Animal	Others
Snow	18	17				35
Star Dollars	12					12
Tan Baby		17				17
Teenie Tiny Woman		11				11
Three Billy Goats	16	12			28	
Toto and Little Chicks		11			11	
Two Boats	18		18			
Wee Gellies	12					12
Wee Mousey	24	28			52	
Wolf and Seven Kids		11			11	
Totals—30	414	360	30	79	238	427
		774				774

Part B Titles Given By Both Primary Children and Parents

	B	G	Parents			
Alice in Wonderland		17	50			67
Animal Stories	56	48	10		114	
Bible Stories		17	57	74		
Bobbsey Twins		11	17		28	
Cinderella	12	53	27			92
Ferdinand the Bull	12	11	55		78	
Gingerbread Boy	52	27	10			89
Little Black Sambo	37	40	40			117
Little Red Hen	18		11		29	
Mickey Mouse	34		27			61
Mother Goose	112	100	69			281
Peter Rabbit	36	34	25		95	
Pinocchio	148	55	67			270
Snow White	30	64	86			180
Three Bears	84	235	13		332	
Three Little Kittens		11	21		32	
Three Pigs	57	146	21		224	
Uncle Wiggley		11	23		34	
Wizard of Oz	24	40	18			82
Totals—19	712	920	647	74	28	938
			2,279			1,239
						2,279

Part C. Titles Given By Parents But Not By Primary Children

About Things	12					
Adventure						46
Alphabet			21			
Art Series for Little Children			13			
Barbar Stories					48	
Book of Knowledge			23			
Child's Garden of Verses						90
Children of Other Lands			30			
Delicia				10		
Donkey-Donkey					10	

TABLE 3 (continued)

Titles	Times Boys	named Girls	Nature of stories			
			Misc.	Educational People	For enjoyment Animal	Others
Five Little Peppers				10		
Ginger					10	
Hansel and Gretel						10
Here and Now			13			
Heidi				38		
Home University Book Shelf			13			
Honey Bear					17	
Junket is Nice			13			
Just-So-Stories						17
Manners Can Be Fun			13			
Mary Poppins Books						23
Milne's Books						121
Patsy Ann						11
Peter Pan					25	
Ping					13	
Raggedy Ann Stories						33
Story Book of Clothes			13			
Story Book of Trains			16			
Teenie and the Old Man						16
Told Under the Blue Umbrella						18
What Am I?			15			
Totals—31			195	58	140	368
						761

by primary grade children. Part A gives 30 titles named by the children, but not by the parents. The equated total of times named was 774. A rough division of these into types gave 30 choices of what might be called definitely educational stories, 79 featuring real people, 238 mainly about animals, and 427 choices otherwise mainly enjoyable.

The table also shows that there were 12 titles named by the boys only and 8 by the girls only. All of those given by the girls only were of the incidental enjoyment type, such as *House in the Woods*, *Return of St. Nicholas*, *Tar Baby*, etc., a type well provided by parents, as shown in Table 1. Of the 12 choices by boys only, however, at least one-half were of a much more mature and specialized sort, dealing with real people and the world about us, such as *Airplane*, *The Baby Who Needs Milk*, *Barefoot Abe*, etc. Perhaps maternal parents better meet the needs and interests of their daughters than those of their sons, or perhaps children's literature is less fully supplied with materials of special appeal to young boys.

Part *B* of Table 3 shows 19 titles given by both children and parents an equated total of 2,279 times. All of these stories, except the Bible stories, may be classed as mainly ones for enjoyment, 938 choices featuring animals. The presumed purpose of the Bible stories, although many presentations of such are thoroughly enjoyed by children, is for religious or ethical ends, which does not seem to be so for the others.

Part *C* gives 31 titles named only by parents. There was an equated total of 761 choices for these, roughly classed as follows: 195 educational, 58 dealing mainly with persons, and 508 otherwise mainly enjoyable. Apparently the parents had made a definite effort to have reading contribute to the growing understanding which children have to make of the world around them. For example, such books as *About Things*, *Art Series for Little Children*, *Children of Other Lands*, etc., may, especially if written in ways interesting to children, contribute much to children's understanding.

Table 4 gives the number of stories named less than 10 times

	P S		H E S		Jr. H. S		H H S		H C		
	B	G	B	G	B	G	G	G	G	Parents	Total
Actual number named	101	90	74	63	151	157	54	128	721		1,539
Equated number named	404	360	451	359	151	157	216	333	1,514		3,945

by equated scores. Both the actual number of these stories and the equated number are shown in the table. The latter figures may not be very near what actual report by 320 persons in each group would produce, for the number of additional stories that would be available to larger and larger samplings of groups would probably not keep pace with the increasing proportion of persons reporting. The large number of titles given by the parents, however, indicates that none of the other groups had anywhere near exhausted the great variety and number of children's books available in New York City.

All groups showed a large number of stories named by only one, two, or three individuals. The relatively smaller number named

by the junior and senior high school groups may be explained, at least in part, by the probable fact that those students had less interest than the others in young children's literature.

One conclusion seems obvious: children and parents evidently choose reading material of great variety and quantity. Probably their choices are governed considerably by material easily available to them. Presumably schools and libraries induce them to choose the better literature in so far as they have such to offer them. In addition, other sources, such as department, drug, and stationary stores, have found an outlet for children's reading material, and probably seek the cheapest and therefore often the poorest books and stories to offer customers. After the old standard ones, such as *The Three Bears*, *Little Red Riding Hood*, etc., have been provided, any others with titles or covers to strike the sentimental strings of parents' hearts, or the thrill seeking impulses of children, are added to the shelves or spread on the counters. Hence our data give scores, if not hundreds, of titles no children's librarian would recognize, but which have high sales value, such perhaps as *Monkey Twins*, *Mr. Tiddy Paws*, *Little Elephant Catches Gold*, *Bobbie Bubbles*, *Don Don Flies Away*, and the like.

D. SUMMARY AND SIGNIFICANT CONCLUSIONS

Reports by young children, junior and senior high school and college students and by parents of young children, gave titles of stories especially liked by young boys and girls.

Reports of high school and college students did not agree closely with expressed preferences of young children, in part apparently because of inaccurate memory or understanding by the older subjects making report.

Reports of parents indicated a willingness to provide books and stories which children like, and also an effort to find stories that would be good for their children, even, perhaps, if not so very interesting to them.

The 272 young children interviewed showed greatest liking for *The Three Bears* and other children's classics, such as *Mother Goose*, *Little Red Riding Hood*, and *Cinderella*. Where conditions had permitted they also showed special liking for some of the more

modern literature. The keys to the conditions may have been (a) parental means to purchase suitable children's books, (b) parental knowledge about literature appropriate for children, and probably (c) convenient availability of materials.

Boys seemed to tend to prefer more mature and robust stories than did the girls, and parents seemed to have supplied the needs of their daughters better than those of their young sons.

The practical suggestion from the study seems to be to find ways to make still more widely available material of constructive interest to young children, particularly for boys. Probably lower costs and greater convenience coupled with wider parental understanding would be somewhat effective.

Schools and organizations interested in young children's development presumably could be helpful in one or another of these respects. Greatly increased library facilities in both schools and libraries available to parents and children would be most desirable means of meeting the reading interests and needs of children and the efforts of parents to find books for their children. Traveling libraries to carry young children's books directly to the homes might be of extraordinary success. The data given by the college students indicated the desirability of arranging that students who are preparing for educational service, be more familiar with the reading interests of young children, the appropriate materials for them, and effective ways of bringing the materials within the reach of children.

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CHILDREN'S CONCEPTION OF PHYSICAL CAUSALITY: A CRITICAL SUMMARY*

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The problem of the development of causal thinking in children has engaged the attention of child biographers from the beginning, but it is only within the last two decades that it has been brought into the laboratory. A very good experiment by Carla Raspe is the earliest published that has come to our knowledge (36), but by far the most extensive and consequential series of laboratory studies are those contributed by Jean Piaget and his collaborators (31). Since then over 20 experimental papers have appeared, testifying to a growing interest in this important field.

The problem has many aspects. This paper will deal only with the general question of the nature of physical causation as conceived by the child, or, more accurately, how the child explains those phenomena which *we* call "physical." This is in effect inseparable from the question of the child's conception of the world of reality. We propose to examine critically such of the literature as we have access to,¹ including some published only in oriental languages, in the hope of arriving at an integrated view of the matter as warranted by the accumulated evidence.

A REVIEW OF INDIVIDUAL STUDIES

1. *Piaget's Thesis*

To introduce our problem, we cannot do better than to take Piaget again as the point of departure. Piaget's works are by now too well-known to require a lengthy summary. We have to mention briefly those features, however, which have a direct bearing upon our main issues.

*Accepted for publication by Arnold Gesell of the Editorial Board, and received in the Editorial Office on November 1, 1941.

¹On account of the Japanese invasion in China and the European war, we regret to say, many of these studies are not available to us at first hand especially the German ones.

Piaget employed what he calls the "clinical method," which amounts to individual interviews wherein the experimenter questions or cross-examines the child to get at his thoughts and beliefs. Various phenomena of nature were mentioned or demonstrated and the children were asked to explain them. The topics included, among others, the wind and the air, movements of all sorts, the phenomena of floating and of shadow, and the mechanism of engines and motor vehicles. His conclusions are summarized at the end of his book (31) and again very neatly in an article (32). The explanations elicited are classified into 17 types. Of these the following—when finer division into sub-stages is disregarded—are considered characteristic of children before seven or eight years of age:—namely, *motivational, finalistic, phenomenistic, participational, magical, moral, artificialistic, and animistic*. The child interprets everything in the world by these "structures" of the mind. Physical causality, properly so-called, is yet non-existent. And this is true only because his thinking is *prelogical* and *egocentric*, radically different from that of the adult.

It will be seen that this is strikingly similar to Lévy-Bruhl's theory of the mentality of primitive peoples. Lévy-Bruhl asserted precisely that primitive mentality is mystical, precausal, and prelogical—qualitatively different from that of the civilized man (23, 24).

With *dynamic explanation* as the transitional form, according to Piaget, the remaining eight types of explanations (namely, *reaction of the surrounding medium, mechanical causality, generation, substantial identification, condensation and rarefaction, atomistic composition, spatial explanation, and logical deduction*) are physical and mechanical. Such conceptions, regarded as typical of civilized adults, are said to begin to appear by seven or eight years of age, and not to have become prevalent until 10 or 11.

Although the infantile causal structures are admitted to arise from the joint influence of environment and mind, or the "intimate and indissociable relation between maturation and experience" (33, p. 151), the appearance of the successive stages seems to be regarded as something universal and inherent in the developmental process. While again all structures are admitted to be "more or less plastic," they are said to be resistant to the corrective influence

of experience. Elsewhere (31) it is stated that the child is "imperious to experience"—a phrase which again strongly reminds one of Lévy-Bruhl.

Traditional philosophy traces two rival theories of the genesis of the concept of causality, the Humian and the Lockian. According to the former, causality originates in the association imposed by the customary succession of external events; according to the latter, expounded again more recently by Maine de Biran, it arises from the psychological experience of personal activity or muscular effort. Piaget claims that, although contradictory, these theories are both correct in the maximal degree during the earliest period, from several months to three or four years of age. During this time the causal conception is at once magical and phenomenalistic. By magical causality is meant the belief that the subject's thoughts, utterances, and gestures are efficacious in bringing about changes in the physical world. By phenomenalism is meant the tendency to take contiguous events as causally related. The co-existence of such opposing notions is accounted for by the fundamental characteristic of the child's mind, that there is a confusion, or lack of differentiation, between the subjective and the objective. The "I" and the external world are not clearly distinguished. As thought matures, there is progressive *rationalization* and *de-subjectivation* (or *objectivation*), resulting in a mechanical conception of the physical world.

Although we have no intention to offer criticisms at this stage, we must permit ourselves certain remarks on terminology which will facilitate further discussion. Piaget's distinction of types of causality appears unnecessarily refined. Other workers have complained that there was great difficulty in maintaining a clear and distinct differentiation between the different types and that certain of the types are very specific to a certain kind of questions and do not deserve a special category (8, pp. 53-54). We shall take the motivational, finalistic, moral, artificialistic, animistic, and probably dynamic forms together as all implying the treatment of physical phenomena like animal and human behavior, and refer to them as *animism* or *anthropomorphism*. This practice seems implicit in several other writers (e.g., 7; 43, pp. 409 f.).

Stern has objected to the term "precausal" as applied to an-

thropomorphic explanations (43, p. 410). Similarly, we fail to appreciate the fitness of the word "mystic" in this connection. The trouble with child anthropomorphism or animism is that it is applied in wrong cases. Where applicable, explanation in terms of conduct, motives, and social rules seems quite legitimate and comprehensible, and is done by all of us every day. Phenomenalism, too, being based on association by contiguity, is as such not necessarily mystic. Such a characterization seems to us appropriate only in the case of *magical causality* and *participation*, as Piaget uses the terms. Following Lévy-Bruhl, Piaget defines the latter term as "that relation which primitive thought believes to exist between two beings or two phenomena which it regards either as partially identical or as having a direct influence on one another, although there is no spatial contact nor intelligible causal connection between them" (30, p. 132).

For our purpose, also, the physical explanations need not be subdivided.

2 The Biographers

Child biographers have long noticed the occurrence of animism or anthropomorphism in children. Dennis, who has reviewed for us the history of child animism, says, "Nearly all of the other writers of the biographical school, of which there are more than 50, have presented some records of this sort" (7, p. 262). If he believes that when this fact is more widely appreciated, Piaget's views should gain even fuller acceptance.

It seems to us that what these biographical records do show is that the child does sometimes anthropomorphize nature. But the questions still remain: How generally? Does he also think physically and realistically? And if so, to what extent? Which is the more dominant in his everyday life? Under what conditions does each occur? Our impression is that the diary data by no means prove that anthropomorphism is the typical and universal mode of children's thinking, and, much less, that it is the only and exclusive one—i.e., that they are incapable of physical concepts. On the contrary, it seems most likely that such instances as recorded by the biographers are but relatively rare incidences in the total stream of the child's intellectual life. They are noted precisely because they are odd and striking. The hundred and one more prosaic

utterances and actions of the child when referring to inanimate objects are taken for granted and passed over. The biographers evidently find the occurrence of animistic notions interesting enough, but do not set themselves the task of determining how large a rôle these play in the child's life.

Weiner (51) accepts Piaget's view of the explanations of children (pp. 279-284) and presents an elaborate treatment of the child's magical tendency, with numerous examples (pp. 344-354). Similarly to Piaget's espousal of Lévy-Bruhl's terminology, Werner is ready to draw a close parallelism between the mind of the child and that of primitive peoples. His evidence, however, is frankly anecdotal. It proves as much and as little as that of the biographers. Weiner himself does not deny the child's readiness to behave in a "technico-natural" manner, only, he claims, to the child this is often insufficient. Besides this there exists for the child a real connection between the magical practices and his fortune (p. 350). In other words, when these ideas occur, they do not take the place of physical concepts, they exist side by side with and supplement them.

According to the recent diary records of *Two Parents* (49), by four years then boy was asking "many questions which seem clearly to demand causal explanation, and this fact is confirmed by the very strong interest shown in inanimate physical objects." It is said, again, that he gave animistic explanations of things beyond his comprehension and of matters about which he could not experiment. But he consistently gave causal explanations when he could experiment, when he was interested, and when the subject matter was within the range of his understanding.

In our experience with two children who are now seven (girl) and four (boy) respectively, instances of animistic or mystic causality have been so rare, and then so ambiguous, as to be almost non-existent. We quote a few examples of their thinking:

- (1) One day, when the children were 6 1 and 3 10 respectively, the younger of the two came to ask the following question "*When I put my [glass] marble in the water, it flattened down, and when I took it out it 'fattened' again. Why?*" I answered, "*When it was under water it felt cold and shivered and cuddled together. When you took it out it felt nice and warm and so it stretched itself again. Is that right?*" Both children roared in laughter and shouted "*No! No! No!*"

Then I tried to explain it as owing to the way the light came through to the eye, without being really able to make it simple enough for their understanding. But they appeared much better satisfied.

His interest being thus aroused, the younger one noticed later in the day that his chopsticks looked bent in the soup and again asked why. I said, "*What do you think?*" The boy answered, "*I don't know*", but his elder sister said, "*Is it because the soup is hot and they become softened?*"

(2). Aⁿ older and more telling example. When the girl was only 111, we took her one day to a shop. Her attention was arrested by a toy elephant on the shelf. It happened to be a well made mechanical one. I wound it and placed it on the floor and it started to walk in the most life-like fashion. The child was frightened and shrunk close to the mother. With our assurance she watched on fascinated. When I finally asked her whether I should buy it for her, she shrunk again and said, "*No, no! It is so fearsome!*"

3. *Carla Raspe* (1924)

We have reviewed Raspe's article (36) in some detail in an earlier paper (13, pp. 144-147, 166-167), and so shall be very brief here. In one series of her experiments Raspe exhibited to children between 6 and 14 in age the psychological phenomena of color contrast and negative after-image, and asked for explanations. The theories obtained are presented in four groups. Three of these are admittedly natural. No numerical data are given, but these seem to form the bulk of the elicited responses. The fourth type is one in which the child is said to grasp at mystical factors to solve the riddle. In another series some actually irrelevant event, like the beating of a metronome or the turning on of an electric light, was made to accompany the presentation of a size illusion. In the children's explanations of the illusion the irrelevant factor was often linked up with the strange effect. The author again regards this as the manifestation of mystical thinking and beliefs in powers, influences and activities which are not perceivable by the senses but are nevertheless real to the child. Like Piaget, Raspe is strongly reminded of Lévy-Bruhl. We have examined the data and illustrations carefully and found the interpretation of magical causality and the alleged relation to primitive thinking rather far-fetched and unconvincing.

4 *Ell: Herzfeld and Kate Wolf*

Another early study was first reported by Ch. Bühler in 1928 (4, pp 204-207). We are happily surprised to learn that Herzfeld and Wolf, also, have employed magical tricks for the purpose. Besides two of these a magnet, two geometrical optical illusions, the negative after-image, and dreams were used. The subjects ranged from six to nine in age, but the number is not mentioned.

The first note-worthy point in the result is the presence of many cases where the child gave no explanation but reported the facts as such. The frequency of such responses decreased from 31 per cent at six years to 4 per cent at nine. The explanations obtained are classified into three types: The mythical (*märchenhafte*), the magical (*magische*), and the realistic (*realistische*). By the mythical is meant the anthropomorphic, as is illustrated by the following. When a toy magic-book was shown in which, by a simple manipulation, a changed figure became visible, a child of six, after some remarks of puzzlement, said, "Why, yes, the man has ridden through here, he has got here riding on the donkey (*Aber ja, der Mann ist doch hier durchgeritten, auf dem Esel ist er hier durchgeritten*)."

The next example is interpreted to indicate magical causality. When an explanation for the after-image was required, a girl of 10.00 looked helplessly and searchingly round the room. Her gaze rested on a green foliated plant standing about two meters behind her. "The green light (*Der grüne Schein*)," she said. Her attention was called to the fact that, the plant being behind her, the light could not well have come from it. Thereupon she pointed with her finger to the green spots on her dress, "Then it must be from this (*Dann muss es davon sein*)."

We quote again the percentages (Table 1).

We note that the magical type is regarded by these authors, in accordance with the statistical evidence here given, as transitional

TABLE 1

Types of theories	Age in years			
	6	7	8	9
Mythical	8.4	3.4	3	—
Magical	42.6	29	16.5	3.6
Realistic	49	67.6	80.5	96.4
	100	100	100	100

between the anthropomorphic and the scientific, whereas it is considered by Piaget as more primitive than the anthropomorphic. This seems to suggest that the classification of individual responses under the different categories is largely a matter of subjective judgment. Still more worthy of attention is the fact that, according to the above table, no less than one-half of the responses are already realistic by six and two-thirds, by seven. According to Piaget, they should be just beginning to appear.

5. Karl Zeininger (1929)

Zeininger (53) asked a class of nine- and ten-year-old children to explain various meteorological phenomena and the growth of tadpoles. Between the magical and the causal, Zeininger found an intermediate stage characterized by "if-then" thinking (*wenn-so-Denken*). "If I want this, I have to do this; if this is the end, that is the means." This practical causality lasts till puberty. Zeininger, however, emphasizes the decided rôle of the accumulated store of experience. When the subject-matter of the question is within the sphere of the child's experience, as was in the case of the tadpoles which the children had often watched in the aquarium, a six-year-old would much more readily explain it realistically than magically. On the other hand, even for a child of 11-12 years, "magical thought appears where the evidence of observation and experience is lacking," as was in the case of the meteorological phenomena. Again, the type of thinking is a function of the individual. Zeininger postulates three types of children: The magical type ("*magisch gerechteter Typ*"), which manifests already in childhood a preference for illusionary games in play; the intellectual type ("*straff intellektueller Typ*"), which shows a tendency to be interested in technical games, to seek the truth, to uncover real connections and causes; and, the type dependent on authority ("*autoritär gebundener Typ*"), which tends to imitate and reflect what its environment is thinking and feeling.

6. I. Huang (1930)

In the year 1928-9 a series of experiments was carried out in Professor Koffka's laboratory at Smith College.² As the experi-

²With the assistance of Miss Marjorie Armstrong who took most of the protocols.

ment-by-experiment plan of the original report (13) makes it rather difficult to get an adequate general view of the results, we shall attempt here a summary and restatement of some of the most relevant findings, with comments.

About 47 children between 4 10 and 10 3 (the majority being under seven), and 10 college girls were individually interviewed. All the 14 or 15 experiments involved *strange* phenomena—that is, simple demonstrations in which the outcome was unexpected and surprising. Some familiar and fundamental laws of nature were apparently violated. The subjects had to explain them. Some of the demonstrations were conjuror's tricks: in one a toothpick wrapped in a handkerchief and broken up by the child, reappeared whole and intact (The Broken Toothpick). Others were psychological phenomena: as Jastrow's illusion, the Muller-Lyer illusion, and simultaneous contrast. The majority were physical demonstrations involving some forces unfamiliar to the lay mind: e.g., a large die remained on the table when the card previously placed under it was suddenly brushed away (The Die on the Cards); the water in a glass tube stayed in it when it was turned upside down with a small piece of paper covering its mouth (The Inverted Tube of Water), a needle was made to "float" or sink in a glass of water at will (The Floating Needle).

The first reaction of the child was usually one of joyful surprise, especially in connection with the conjuror's tricks. The emotional manifestations would be followed by eager investigatory behavior, such as scrutinizing, searching and trying the process by himself. Exclamations and spontaneous questions like "*How did you do that?*" "*Why does it do that?*" "*Why doesn't it do that?*" etc., were very common.³ In one case a girl of four, when the whole toothpick was revealed, stared at the experimenter and burst into tears.

Such reactions seem fraught with a significance which, just because of their obviousness, is easily lost sight of. They show that the strangeness of the situation was fully appreciated by our subjects. The child entertains certain expectations as to what would lead to what, call these his causal conceptions, beliefs, or "mental structures," "anticipatory schemas," "sign-gestalt-expectations," as

³Compare with Mr. Nathan Isaacs' "epistemic questions," (16, pp. 291 ff.)

you will Our problem is just what these are like in the child. The answer is evidently defined by what he accepts as the usual, the natural, the expected course of things, and, contrarily, by what he regards as strange and surprising. If to him every object is endowed with free will, if anything may happen by mystical participation, if human thinking and wishing are omnipotent, he should see nothing unusual or weird in such demonstrations. The facts, however, indicate definitely that he expects and wonders at just about the same sort of things as we do

An interesting side-light is gained from Tinklepaugh's study of delayed reactions in monkeys. The usual procedure was to display a piece of food to the animal, place it under one of two cups and then raise a board in front of the cups which screened them from the animal's vision. After the delay, the monkey was told to "come and get the food." Under ordinary circumstances, the monkey would pick up the proper can and seize the food. Now in the *substitution test*, the experimenter would put a piece of banana under the cup with the animal watching, and then, after the board was raised, would secretly take the banana out and deposit a piece of lettuce in its place. When the animal discovered the lettuce, she searched all about for the banana, and went away without touching the lettuce. On occasions she turned toward observers present in the room and shrieked at them in apparent anger. Even a monkey, then, is astonished by a strange phenomenon, and does not accept "magic" unquestioningly (47, pp. 224 f.).

But to resume: In over 370 protocols obtained from the children, there were only about 10 cases which contained statements capable of being interpreted as indicating magical, anthropomorphic, or supernatural causality. Six of these were obtained from one girl of five years who resorted to the expedient of "fairies" rather stereotypedly and fancifully. In all but one of the 10 instances, again, the non-physical explanations soon gave place to some practical theories. The exception was the case of a child of 6:1, who persistently explained the behavior of the die on the card by saying because it *wanted* to do so.

The bulk of the elicited explanations cannot adequately be classified into Piaget's 17 types. Instead, they fall readily into two

great groups, the naturalistic (physical, materialistic, realistic) explanations and the "if-then" explanations

We illustrate the former by listing the typical responses for some of the experiments

(a) *The Broken Toothpick* The toothpick has not been really broken to begin with. There are two toothpicks

(b) *The Die on the Card* The die does not fall with the card because the experimenter hits the card but not the die. The paper is slippery. The experimenter tips or tilts the card

(c) *The Inverted Tube of Water* The paper supporting the water sticks to the tube because it is wet and therefore sticky. There is something sticky (glue, sugar, etc.) on the rim of the tube

(d) *Jastrow's Illusion* The upper piece looks smaller because it is farther away

It will be seen that most of these theories are scientifically quite incorrect. But the question of correctness or incorrectness is beside the point. It is not to be expected that the child should be able to explain these phenomena correctly without having had the specific training in physics. In fact, in choosing to use *strange* phenomena the very point was to avoid being served with ready-made, schooled answers. The child was expected to frame his explanations, right or wrong, on the spot, and to reveal the *type* of causal conceptions that was most natural to him. The attempted theories as quoted above clearly do not depend upon mystical participation or anthropomorphic agents, but upon forces and processes of a distinctly physical character. In this sense they are regarded as naturalistic.

Another characteristic of these explanations is that they usually involve the application of some simple, familiar, and tangible principles to the phenomena, in place of the subtler and more difficult concepts as scientifically required. For instance, for the inverted tube of water the correct explanation requires the concept of air pressure of which the child was ignorant, he explained it by the much more familiar principle of *sticking*. The proper explanation for Jastrow's illusion is—Goodness knows! the child assimilated it beautifully to linear perspective. Similarly, where the physicist would have to mention surface tension, centrifugal force, and other

learned profundities, the child would strain the use of concrete, palpable, and common-place processes as pushing, pulling, falling, blowing, blocking, supporting, and the like. The resulting explanations are wrong, but they can be plausible and comprehensible. For lack of better description, they are styled as "naïve." The characteristic of childish explanations, therefore, is not mysticism but this naivety.

In the responses given by the control group of college girls, exactly the same sort of thing was found—naïve application of simpler principles in place of the correct but subtler and less known ones. The main difference is that reference to technical physical terms like inertia, friction, and air pressure were more common, often with wrong applications. Their fund of available concepts included these as the result of school learning.

Frequently the child would mention "if-then" explanations as the explanation of a phenomenon some circumstance which was observed to accompany it, without being able, however, to tell how it works. For instance, the die on the card remains on the table when you pull the card forcibly, and falls, when you pull it gently, the line (Müller-Lyer illusion) looks longer when the arrows are turned out, and shorter when they are turned in; the cardboard (Jastrow's illusion) look unequal because you put one here and one there. Further questioning failed to elicit any elaboration of the *rationale* or the intermediary steps in the process of causation. The appreciation of the relation would seem to be not a rational but a perceptual affair. The connection was simply seen. It seems to be a *post hoc, ergo propter hoc* causality, similar to Piaget's "phenomenalism."

And yet, it isn't that any concomitant event is likely to be taken as the explanation of a phenomenon (Cf. 31, p. 253). There are evidently *factors of selection* which favor the noting of certain facts and their acceptance as relevant explanations, even though no logical justification can be offered for the combination. As this has been made the theme of another experimental study, we shall leave it for a separate article (14a).

As a type the "if-then" explanations were also quite frequent for the adults, although, as a second major difference between the two

groups, the college girls were usually more successful in devising some sort of theories of the *modus operandi* of the causation.

When a child is confronted with a strange phenomenon, he is thrown into a state of conflict. His expectation leads one way and his perception leads another. How does he resolve the conflict? Analyzed from this point of view, the obtained responses represent all grades of variation between the dominance of pre-existing conceptions and the dominance of the momentary sense impressions. In many cases the theory is almost entirely prescribed by the established knowledge and beliefs. The child may make assertions without any perceptual basis, or even falsify the sense impressions to meet the rational needs. Thus a child might insist that there must be two toothpicks, although he never saw but one, or assert that the needle was *light* (when it floated), or *heavy* (when it sank). He might claim that he had felt the toothpick bent but not really broken, or that the experimenter tilted the card to leave the die on the table. In other cases there is joint determination by both known principles and perceived data. Either the anticipatory schema predisposes the child to perceive the required features or the objective sense datum reminds him of the known principle. For instance, after the needle was seen to float the child might say it was because *the needle was dry, or had air in its eye*. Or, again, the piece of paper stayed on the inverted tube because it was wet and therefore sticky. At the other extreme are the "if-then" responses in which, without any known principle to explain it, the factual concomitance is simply perceived and noted.

In a number of cases, especially in the younger children, the conflict was never resolved. The child remained in a state of bewilderment, suspension, and uneasiness. His answers would be characterized by ambiguity, suggestibility, inconsistency, and verbalism.

If the reality of pre-existing conceptions is amply demonstrated in the children's responses, the power of sensory experience to determine then thought is equally evident. Not only were theories often derived from and influenced by the perceptual data but, as the demonstration and questioning went on, the child was quite capable of seeing his previous errors and discarding or modifying

them accordingly. The child is by no means "impervious to experience."

To sum up, the child's concept of reality and causality, as revealed under these experimental conditions, is very much naturalistic, factual, and logical, and, barring certain differences entirely accountable by disadvantages in general intellectual maturity and specific experience and training, quite similar to that of the adult "man in the street."

7. *Susan Isaacs (1930)*

One of the most important contributions to the problem is that of Mrs. Susan Isaacs (16) who, taking an entirely different line of approach, has arrived at conclusions quite different from Piaget's but very comparable to those of the study last mentioned. Her data consist of behavior records of a group of young children at the Malting House School at Cambridge, England, varying in number between 10 and 20 and covering an age range from 2;7 to 10;5, during the three years of observation. These records, taken during the children's free, active life, afford deep and vital insights and are undoubtedly characteristic of the everyday mentality of the everyday child. Her interpretations, barring a heavy leaning on Spearman's theory of *noegenesis* which all psychologists are not prepared to accept in whole, are distinguished by their sanity and sympathetic understanding.

Isaacs presents cases to show how the children applied knowledge already possessed to new situations, theoretically and practically, and how they increased their knowledge by experiment, observation, and discovery. The children's behavior as recorded evidences a strong and spontaneous interest in the things and events of the physical world, even in the earliest years. Above all, the clear statements and adequate explanations they offered far antedate Piaget's view of the age at which mechanical causality is at all understood (see, e.g., pp. 81 ff.). Only exceptionally did they show magical precausality, even as adults sometimes do. "Allowing for the immense difference in knowledge and experience," she concludes, "they went about their business of understanding the world and what happens to them in it, very much as we do ourselves" (p. 57).

In attempting to account for the difference between her own

results and Piaget's, Mrs. Isaacs suggested as possibilities that the mental ratio and general environment of the two groups of children might have been different. But the point she took most seriously is that the "clinical method" Piaget employed is unsatisfactory. The questions are unfair and often suggestive, the situation is stereotyped, the technique might bring into light not the intellectual tools of the child in practical life but his deeper phantasies. In Mr. Nathan Isaacs' appendix to the book further objections are urged. The "why" questions we ask the child may never have existed for him. He has not got the question as we intend it. But he is expected to say something. The result is that his answer is not a belief but a verbal association. Or, he may fall back upon *trained habit and prepared resources of formal answering*, by looking for intentions or purposes.

We permit ourselves to insert the comment that Piaget himself has written an excellent discussion of the value and pitfalls of the clinical method (30, Introduction). It seems to us, too, that all methods have their good and bad points. At this stage of our science, no source of data, no angle of approach, can we afford to exclude. Moreover, others using the method have shown that it is not intrinsically incapable of revealing facts quite similar to Mrs. Isaacs'.

In Mr. Isaacs' appendix on Children's "Why" Questions we read one of the most brilliant treatises on the development of child thought, and of human cognitive activity in general. According to Mr. Isaacs' thesis, the child, like ourselves, builds up from his experience (taken in the broadest sense), certain beliefs or assumptions or "anticipatory schemas" regarding reality. He acts on these implicitly and unreflectingly until he encounters some new experience which clashes unexpectedly with them. Then there is a shock, a sense of something wrong with knowledge. He is stimulated to a genuine interest in the revision, extension, and re-organization of his knowledge. His "why" question is a way in which he seeks to resolve the conflict, by appealing to adults for help. This is the original, primitive, "epistemic" why. It soon differentiates into various derivative types. There are those which imply motives, purposes, and uses. But there are also those which concern themselves with genuine causes and explanations. Mr. Isaacs quotes

and analyzes actual examples to show that children from at least four to five years onward clearly and freely show "why" of the epistemic and derivative causal types, thereby demonstrating the identity of child thought with that of the adults.

Part of Piaget's evidence for his theory is shown to be due to the artificiality of clinical method and part, to challengeable interpretation of the significance of the children's words. The residuum of true anthropomorphism and intentionalism is understandable as plausible errors and natural products of previous experience which can be readily disabused with failure in their functioning. The inference of compelling internal structures to account for them is unnecessary. Mr Isaacs grants a certain degree of fixity to our beliefs, but the child is quite capable of receiving factual challenges and looking for ways of meeting them.

In his reply to Mr Isaacs' criticism (33, 34), Piaget states that the difference between his view and Isaacs' is merely one of perspective. Isaacs' point of view is functional and prospective, while his own is retrospective and structural. The two are complementary rather than contradictory. At bottom, there is no difference between Mr. Isaacs' anticipative schemas and what he has called structures. Mr. Isaacs studies them in process of formation, at the moment when on contact with new experience they either disintegrate or are strengthened, while he has studied them in their origins, as crystallizations of the past activity of the whole subject.

But Piaget insists that these structures or anticipatory schemas conform to his conceptions. Thus in the question "Why has the cave to be so dark?" he would grant fully the epistemic element, but he thinks that to the child "darkness" is a substance endowed with force, with mobility, at times even with purpose. Likewise, "has to be" may imply finalism and artificialism.

In our opinion, the crux of the issue is indeed just what these structures or anticipatory schemas are like in the child. The complementary nature of the two views is not evident, in so far as the instances presented by Mr. and Mrs. Isaacs of real physical thinking and straight-forward causal explanation have not been convincingly proved to be not what they seem, but at bottom anthropomorphism and mysticism.

8. *E. C. Johnson and C. C. Josey (1932)*

That Piaget's conclusions are not attributable to peculiarities of the clinical method is shown by the work of Johnson and Josey, who duplicated Piaget's studies on the child's language and thought, judgment and reasoning, and conception of the world. Their "results substantiate few of the claims of Piaget." Regarding the conception of the world, they "did not find that the thinking of children of six is characterized by finalism, artificialism, or animism." To explain the tremendous differences the authors suggest as one possibility the difference in the *IQ* of the children studied. Another suggestion is that perhaps the English language is superior to the French as an instrument for logical thinking (17).

9. *Margaret Mead (1932)*

In Mead's study of children of Manus tribes on the Admiralty Islands the theories of Piaget and Lévy-Bruhl converge (25, 26). Here, if anywhere, one would expect anthropomorphism and mysticism to stand out in the strongest relief. Miss Mead elicited free crayon drawings, called for interpretations of ink blots, and attempted in test situations to shift blame upon inanimate objects or to attribute will to them. These experiments were supplemented with close observation of games, group conversation, and individual child behavior. The amazing result is that, not only did these "primitive" children manifest no spontaneous tendency to animism but responded negatively to explanations couched in animistic terms rather than in terms of practical cause and effect. "This type of thought was proved to be culturally determined, a potentiality of the human mentality under special cultural conditions, but not the inevitable concomitant of any stage of mental development" (26, p. 915).

10. *Sachiye Ōsaki (1934)*

The main point of interest in Ōsaki's study (28) is that another cultural variation is included. Her subjects were 260 kindergarten and public nursery children and 146 public school children in Japan, ranging in age from 3.9 to 13.9, and her methods were directly based on Piaget's and Huang's. She classifies the elicited explanations into the *physical* and the *prelogical*. The frequencies are given in percentages as in Table 2.

TABLE 2

Subjects	No answer	Explanations Prelogical	Physical
Public nursery	23	76	1
Kindergarten	32	60	6
First three years	20	57	21
Sixth year class	4	36	60

The prelogical answers decrease with age, from 76 per cent for public nursery children to 36 per cent for sixth year school children. "When children have no idea of the cause of the phenomenon, their explanations tend to be prelogical."

What does she mean, though, by "prelogical" causality? Under this heading she subsumes five types of explanations, with examples:

1 *Mere naming.* The broken toothpick gets whole because it is bamboo. Various articles sink because they are iron.

2. *Mere description of attribute.* The die remains on the table when the card is taken from under it because it is heavy. Things sink or float because they are heavy, light, solid, small, thin, etc. A magnet attracts another because it is silver-colored, black (where the paint has been worn off), or concave.

3 *Mere description of phenomenon and action.* The die does or does not fall because *E* pulls the card gently or forcibly, in this or in that direction. The magnets come together because *E* holds them only loosely.

4 *Falsification of experience* (memory and perception). The toothpick has not been broken or shows marks of rejoining. The magnets stick together because there is something on them—paste, drug, oil, cake, etc.

5 *One-sidedness of experience.* This is described more or less as done by Huang, but does not seem to constitute a special type of explanation.

It is at once evident that Ōsaki understands by the word "prelogical" something quite different from its original sense. As proposed by Lévy-Bruhl and adopted by Piaget, it denotes a way of thinking allegedly characteristic of primitive mentality that the fundamental laws of logic, especially that of Contradiction, i.e., that something cannot at the same time be *a* and *not-a*, are not observed. In other words, it is the negative aspect of the law of

participation. Taken in this exact sense, we cannot see how Ōsaki's label tallies with the contents.

Nor can we be quite sure of what she does mean by the term. It does not seem to mean "unphysical," although it is set in opposition to the "physical"; for in many of the examples the explanation seems distinctly to be physical in nature. Neither does it mean "illogical", for, in the falsification of experience, for instance, it is the very rigor of logic which compels the child to claim something without perceptual basis, or in spite of such evidence to the contrary. Since a broken toothpick cannot be restored, this one must never have been broken to begin with. If the assertion is wrong, the fault is not in the logic. Again, Ōsaki's "prelogical" does not seem to correspond always to the *wrong*, for many of the answers as quoted are quite right as far as they go. We are left only with a vague notion that these answers are considered to be somehow *unsatisfactory*. But this is a negative, evaluative, and heterogeneous concept which tells us very little about the nature of reality and causality in the child.

Ōsaki refers to the dynamic and magical causal explanations only incidentally and without making explicit their exact positions in her prelogical category. Regarding the difference between Piaget's and Huang's results, she supposes that "these two different opinions depend upon how and from what viewpoint they interpret children's words." "In my own experiments," she continues, "I found a certain degree of what might be called dynamic and magical causal relations." Only one example is given. In the experiment corresponding to Huang's *Penny in the Turning Box*, in which a small cardboard box attached at the corners to four strings was whirled round and round in the vertical plane with a penny in it, a child said of the coin which did not fall, something like "because of the money" or "because it is money." We cannot see how this proves dynamic or magical causality.

Taking the raw data as presented, we should say that Ōsaki's findings are remarkably similar to Huang's. The "description of phenomenon and action" fits exactly Zeiniger's characterization of "if-then" explanations. "Mere naming" and "description of attributes" are either similar noting of concomitances or are brief and elliptical expressions of some more fully conceived ideas. They

are inarticulate and ambiguous, but not convincingly mystic or prelogical.

Our impression, therefore, is that behind the author's misleading use of the term "prelogical," there is really little evidence of dynamic, magical, or prelogical causality

11. *I. Huang, C M Chen, and H. H. Yang (1935)*

This study has never been reported in any European language (14). Seventy Chinese subjects in Hanchow (40 children and 30 illiterate adults) were studied with the strange phenomena technique. The children, ranging from 5 to 12 in age, were from two schools one, where the pupils came mainly from homes of a better intellectual and socio-economical status, and another, where the pupils were mainly from the working classes. The adults were young men and women, between 16 and 30 in age, enrolled in the night classes of the Provincial Mass Education Experimental School, attending school and learning to read and write for the first time in their lives.

It will be remembered that Lévy-Bruhl included in his material many examples of beliefs and practices among the Chinese, which he regarded as representative of primitive mentality. His anecdotal method is in sad need of experimental checking. Our subjects were probably not the best samples of the unmodernized part of the Chinese population, but, in their milieu many "superstitions" are traditional and the prevalence of scientific knowledge and technological appliances is far behind Europe and America. The adult subjects had never had the advantage of school education, and many of them undoubtedly shared ideas comparable to Lévy-Bruhl's illustrations.

Four experiments were used. Two of them were adaptations of the "*Penny in the Turning Box*" and the "*Floating Needle*." The third was a variation of the "*Heated Bottle*," as follows: A flask was fitted with a rubber stopper, through the hole in which was inserted a glass tubing extending far into the flask. The experimenter held the flask upside down, dipping the outer end of the tubing, which had been drawn into a jet, into a glass of water. He encircled the body of the flask with the palms of his hands, so that the warmth caused the expanding air from the flask to make

bubbles in the water. In the fourth experiment (*The Dime under Water*) a basin was constructed with a hole near the side of the bottom, leading into a rubber tube, about five feet long, the other end of which was dipped in a vessel of water. A head-rest attached to the back of a chair kept the subject's head fairly steady. With the basin some seven or eight feet away, a dime was placed in it and gradually moved until it was just out of the subject's sight, being screened by the side of the basin. Now the vessel was raised. The water flowed into the basin and soon the dime became again visible to the subject.

The results for the two groups of children were so undifferentiable that it was decided to treat them together. Instead of being "impervious to experience," as a rule a subject's opinion changed and developed in the course of the demonstration and conversation and he passed from one idea to another. Therefore, the ideas rather than the subjects are classified. As we are here most interested in the question of the subjects' conception of causality, we need only to parade the kinds of explanations obtained, with the frequencies indicated numerically in parentheses.

The Penny in the Turning Box The children's responses are classified in three groups:

a. Reference to some (irrelevant) observed facts: box is big and coin is small (1, age 6:0), string is pulled straight (1, age 6:2)

b. Explanation by the motion or its speed, without further elaboration: turning it round or in a circle (3), turning it fast (7)

c. With the fast motion of the box as the primary explanation, attempt to elaborate why this keeps the coin from falling: coin is held or pressed by air or wind (11); coin sticks or stays close to side of box (10), time during which box is upside down is too short (9), coin goes or runs with box (3), coin does not move (2); box attracts coin (2), force of gravity is lessened (1)

In the adults' responses Type *a* does not occur and Type *b* only five times. Type *c* explanations are: coin is held or pressed by air or wind (18); time box is upside down is too short (8), coin sticks to or is pressed against the bottom of box (4)

The Floating Needle The children's explanations of the floating of the needle may be presented in three groups:

a Floating attributed to some properties or conditions in the needle: it is light (13), small or slender (6), empty inside, heavy, "not good"; bigger at one end than the other (1 each).

b. Floating attributed to the relation between the needle and the water: the water has not come over it, the needle is not covered with water, or its upper half is dry, etc. (11)

c Floating attributed to the manner of putting it down: it is put down lightly, flat, or horizontal (27).

There was one case in this experiment which might be interpreted to indicate anthropomorphism. When her prediction that the needle would float was proven wrong, a girl of 6:1 said, "Wo shuo ch'ien, t'a p'ien-yao fou ch'i-lai." The nearest translation we can give is, "I said 'sink,' but it *will float*." Two interpretations seem possible: (*a*) merely that it floated against her prediction and (*b*) anthropomorphically, that it *willed* to float in defiance of her prediction.

In the adults' responses Type *b* and Type *c* each occurs 12 times. Corresponding to Type *a* are: the needle is empty inside (2); it is plated and so does not get wet (1); it is dry, or has been wiped (2). In addition to these types, there are the new ideas that the surface of the water is not broken (4); and that there is "electricity" in the glass (1).

The Dime under Water. The explanations offered by the children may again be conveniently classified under three major headings:

a Displacement of the dime: the in-rushing water moves it (14); the "attraction" of the water moves it (1), air current moves it (1)

b Floating of the dime: the dime floats in the water and so becomes visible (3).

c Light, image, reflection, etc: the dime has an image (3); because of light (2), the dime reflects light (1); refraction (1)

In the adults' explanations the idea that the water current displaces the dime occurs 12 times; reference to light and reflection, 9 times. There is the additional idea that the image of the dime becomes bigger under water (2).

The Bubbling Bottle. The responses in this experiment present a confusing multiplicity of variety, with complicated

interconnections We attempt to put some order into the confusion by making the following classification with the children's data.

a Mere statement that something comes down from the bottle or the tube, air comes down (25), bubbles come down (3)

b "If-then" statements and brief explanations without clarification; you hold the bottle with your hands (11), you put the tube into the water (5), the stopper covers it (1), your hands are warm (2); there is electricity in your hands (1), you hold the bottle and the temperature is low (1).

c Fuller explanations heat from hands gets into bottle and down again (5), air comes down, because of holding and heat (1), because heat from the hands gets into bottle (1), because water enters tube (1), water vapor gets into tube and bottle and down again (1), air drives out the water in tube (1).

The adults' explanations are quite similar. Worthy of special mention is the additional idea that the air in the bottle is *pressed* down by the hands.

The following conclusions are obvious. (a) Despite racial and cultural differences, the responses of the Chinese subjects are entirely similar to those of the American subjects in Huang's previous study. (b) There is no qualitative difference between the causal thinking of the children and that of the adults. (c) Mystical and anthropomorphic explanations are almost completely absent. (d) In the obtained explanations two motifs seem to stand out most prominently: naive physical explanations and, failing these, noting of concomitant facts narratively, in and "if-then" fashion.

12 I. Huang, H. C. Yang, and F. Y. Yao

This study was devoted to the special problem of the principles of selection which determine what concomitant events will be related causally by children in the so-called phenomenalist explanations. The details will be reported in a separate article (14a). Here we shall only briefly touch upon the question of the incidence of animistic and mystical causality. In one part of their work Miss Yang and Miss Yao attempted to force "phenomenalist" or "if-then" explanations by arranging to have the strange phenomena demonstrated invariably accompanied by a number of entirely irrele-

vant circumstances. Thus in one experiment the automatic and alternate waxing and waning of the flame of a lamp was accompanied by (a) placing the lamp on a dish containing some colored liquid, (b) setting a metronome beating, (c) turning on and off an electric torch, (d) tapping rhythmically on the floor with the foot, (e) saying "brighten up" and "darken down" at appropriate moments, etc. It can be seen that with the experimenter making it a point of doing these things, the suggestive effect was at a maximum and rational explanations were positively favored. Cases where a concomitant event was accepted as the cause with any mystical and magical coloring in the interpretation were specially noted. It was found that even under such circumstances, in 225 protocols only six were eligible for consideration—one similar to Piaget's dynamism, two to animism, and three to magical causality. In the best case of animism, which sounds almost too good, a child no younger than 9.3 attributed the waxing and waning of the lamp to the torch light. "*It thinks,*" he said, "*I am bright enough and now that you come and shine on me it doesn't matter if I get a bit darker.*" In the magical cases, however, it was not clear whether the child was merely noting the factual concomitance or whether he took the efficacy of the verbal command in good faith.

13 Jean Marquis Deutsche (1937)

For carefulness in planning, thoroughness in the analysis of the data, and freedom from theoretic bias in their interpretation, Mrs. Deutsche's work (8) deserves special attention. She used the group test method. Although her criticism of the "clinical" procedure is in general just, we have the misgiving that in the written group test situation the child might be at an even greater disadvantage than in the clinical one. Apart from the unreplaceable opportunity to supplement the cut and dried written words with observation of the temporal course of concrete behavior, the individual interview, wherein the experimenter and the subject each devotes to the other his undivided attention, is probably more conducive to higher achievements in the child. In a group test, again, the answer has to be given in writing, which, to the younger children especially, cannot but impose added handicaps. At any rate, the response obtained in a group test would seem to be equivalent only

to the unfollowed-up *first response in the conversational procedure*. In our own experience, we often found the child giving at first an elliptical and ambiguous answer like Ōsaki's "mere naming" or "mere description of attribute," but, given the opportunity, he might expand it into a creditable, rational explanation. All this is not saying, however, that we are not glad to see the group test technique tried which permits a larger sampling of subjects with quantitatively more representative data, for, to repeat ourselves, we believe in attacking the problem by all methods, each of which has its particular advantages and disadvantages. If our misgiving is justified, moreover, it not only would not invalidate the general trend of Mrs. Deutsche's findings, but would accentuate it.

Mrs. Deutsche used 11 questions with demonstration (Form I) and 12 without (Form II), most of them adopted from those of previous investigators. The children were between 8 and 16 years old and in Grades 3 to 8—700 of them taking the questions on Form I and 365 taking those on Form II. For comparison, 13 Kindergarten children between 59 and 70 months were individually asked some of the questions.

Mrs. Deutsche analyzes her data both quantitatively and qualitatively. The quantitative analysis, as previously performed by Miss Keen (18), seems to involve a point of view quite irrelevant to the present issue (see below). In the qualitative analysis the first thing was to try to classify the answers according to Piaget's scheme. For objectivity this was done independently by three competent judges. They found it very difficult to force the data into Piaget's 17 types. A pooled classification, however, was finally produced. As the subjects included many far beyond early childhood, the total percentages are perhaps not so pertinent to the present issue as those for the younger ones alone. We quote the figures (partly combined and rearranged by us) for the Kindergarten group¹ and the 8-year-olds and add those for the 15-16-year-olds to show the changing trend with age, in Table 3.

Taking the first four items together as "naturalistic" explanations, it will be seen that these and phenomenalism form the de-

¹Strictly speaking, the data for the Kindergarten group, being collected in a different manner, are not directly comparable with those for the other two groups.

TABLE 3

Types of causality	Age groups		
	Kindergarten (<i>N</i> = 13)	8 (<i>N</i> = 52)	15-16 (<i>N</i> = 28)
1. Mechanical	18.5	32.5	42.9
2. Logical	6.5	10.7	31.6
3. Other physical types	4.0	0.3	0.2
4. Trickery (added by Deutsche)	0.5	0.6	0.1
1-4 combined	29.5	44.1	74.8
5. Phenomenistic	36.5	37.3	10.3
6. Dynamic	5.0	8.3	5.7
7. Magical	8.0	1.6	0.2
8. Participative	0.0	0.0	0.0
9. Other "precausal" types	3.0	2.1	1.6
6-9 combined	11.0	3.7	1.8
10. Unclassifiable	19.0	[6.6]	[7.4]
	100.0	100.0	100.0

cidedly preponderant part of the children's responses, even for the kindergarten group. Dynamic causality is, according to Piaget, transitional and near-physical. The motivational, finalistic, moral, artificialistic, and animistic types are quite negligible all through; so are the magical, from 8 on. Participation, the foundation stone of Lévy-Bruhl's theory and the basis for the concepts of "mystic," "prelogical," and "precausal," comes out with a clean naught. It is to be noted, however, that the naturalistic explanations tend to increase and the mystic and anthropomorphic types as well as phenomenism tend to decrease, with age.

Mrs Deutsche next had the responses re-grouped according to whether the causal agent assumed is *materialistic* or *non-materialistic*, each with subdivisions. The percentages of materialistic and non-materialistic explanations are, respectively, 61.9 per cent and 19.2 per cent for the kindergarten group, 81.3 per cent and 12.1 per cent for the eight-year-olds, and 85.2 per cent and 7.5 per cent for the 15-16-year-olds.

Another significant point in the result is that the types of explanations vary more from question to question than from age to age. It is more the nature of the specific question which determines the kind of response a child makes rather than his general level of causal thinking. In other words, each developmental level is not inevitably characterized by a peculiar conception of reality and causality.

which is generally applied to all phenomena which the child experiences

14. *Stephan Blachowski* (1937)

This author administered a questionnaire on magical practices, especially in connection with school, to three gymnasium classes and some university students in Poland (3). The percentages of subjects who confessed to such behavior at the time of the investigation on any occasion in any degree (marked "practiced now") and, of those who testified that they were unacquainted with such practices from their own experience (marked "unacquainted") are summarized in Table 4.

TABLE 4

Groups	Approximate age	Total number	Practiced now	Unacquainted
Third class of Lodz gymnasium	12-13	39	76%	?
Eighth class of Lodz gymnasium	17-18	17	59%	0%
Eighth class of Katowice gymnasium	17-18	23	78%	22%
University women	—	28	65%	21%
University men	—	21	52%	19%

Although the author sees a tendency for magical thinking to decrease with age, the large number of those who even at university level still indulged in such behavior is indeed surprising. On the basis of the subjects' reports Blachowski concludes that the typical occasions for magical practices are important but difficult and uncertain situations which inspire fear or anxiety. Then such thinking arises either spontaneously or from imitation of others. The importance of social imitation is evident from the data. All three of Zeining's "types" were found. Blachowski accepts the view of tracing magical behavior to the "pleasure thinking" of Freud. This study shows the prevalence of some magical practices even among "civilized" adolescents.

15 *Arthur J Ter Keurst* (1939)

As representative of a related type of study which concerns itself with "superstitions" of school children and college students, we

shall briefly review Ter Keurst's work. This investigator presented a check list of 92 superstitious beliefs to 663 secondary school pupils from Grades 7 to 10 and between 10 and 19 years in age. The mean percentages of acceptance of the items for the various grades fall between 14.4 and 37.6. The most prevalent superstitious beliefs refer to the animistic rôle of nature and a deterministic viewpoint of life. The incidence of acceptance does not decline with chronological or scholastic advances (45). In a second study 50 each of the most and the least superstitious of these subjects equated according to grade, race, and sex, are selected for detailed comparison. Superstitiousness is found to be definitely related to intelligence, scholastic success, socio-economical status, social adjustment, and personality development. The author concludes that superstitiousness is characteristic of that vicious circle which includes an unfavorable environment and inadequate development (46).

16 *L. L. Lacey and K. M. Dallenbach (1939)*

In this study of children's learning of the cause-effect relationship (22), the essential part of the well planned procedure consisted in saying to the child, "Tell me what is the cause of (a) *bleeding*, (b) *smile*, (c) *smoke*, (d) *being hungry*, etc." Two preliminary words were first tried. If the child failed to give correct answers, the experimenter gave them himself by way of instruction, and the test went on. Accepting "merely common-sense explanations," including the "after-this-therefore-because of this" variety, it was found that children learn this relationship without special instruction by the end of the 8th or the beginning of the 9th year. With special instruction, children of the age group 6:7-6:12 have a probability of 0.5 of learning the relation.

The "after-this-therefore-because-of-this" variety corresponds of course to phenomenalism. We have no way to tell whether the "merely common-sense explanations" include mystic and anthropomorphic ones.

16 *Roger W. Russell et al. (1939-1940)*

This series of studies is devoted exclusively to the question of

animism, which, however, is so closely related to that of child causality that we must need give it careful consideration

It is to be expected that the clinical studies mentioned above would appear to many psychologists very unsatisfactory, in that, (a) the questioning procedure varies from child to child, (b) the interpretation of the protocols seems subjective, and (c) the number of subjects included is usually not large enough to permit statistical treatment of the data. Russell and his collaborators attempted, as Miss Keen and Mrs. Deutsche have done, to remedy the situation. They developed a "standardized" procedure, in which a uniform sequence of exactly worded questions was employed. The first and main questions read "Is the ——— living or dead? Why?" This was repeated with each of 20 objects. The responses were independently classified by more than one judge (38). In four studies so far known to us this technique has been applied to more than a thousand subjects (38-41).

It will be remembered that Piaget uses the term *animism* "to describe the tendency to regard objects as living and endowed with will" (30, p. 170). Four stages of development are claimed, in which, respectively, life is (a) assimilated to activity in general,⁵ (b) assimilated to movement, (c) assimilated to spontaneous movement, and (d) restricted to animals, or animals and plants. Now Russell *et al* find it possible to classify practically all individuals into these stages (plus a "No Concept stage") with a high degree of reliability and mutual agreement among the judges (38). This is found to hold true universally for subjects of various types, including 28 Indian children. It is considered likely that individuals pass sequentially through the series of concept stages with increasing *MA* and *CA*, although there is complete coverage of the entire *MA* and *CA* range by each of the concept stage, in a group of 774 children between 6.0 and 13.11 in age. The stages of animism are related to both *MA* and *CA*, the Coefficient of Mean Square Contingency being 0.59 and 0.62, respectively. We quote some of the figures, in Table 5, to show the concrete relation of the obtained responses with chronological age. The development of animistic concepts is further found to be very nearly the same for urban,

⁵This item is stated differently in Russell and Dennis's quotation (38, p. 390). See below.

TABLE 5

Groups of Subjects	<i>CA</i>	No concept	Stage 1	Stage 2	Stage 3	Stage 4
"F"	6 0- 7:11	0	61	20	9	9
	12 0-13:11	0	24	13	34	27
"S"	6 0- 7 11	18	38	18	5	18
	12:0-13 11	0	31	45	11	13
"R"	6 0- 7 11	20	44	16	4	12
	12 0-13 11	0	31	30	21	13

suburban, and rural children (39) Feeble-minded individuals are behind normals of the same *CA*, but are more advanced than normals of the same *MA* (40).

In this connection we cannot help recall that observers of baby behavior have found a fair degree of differentiation between the child's behavior toward human beings and toward physical objects, very early in life. It has been demonstrated by several investigators, for instance, that the earliest smile of the baby occurs in response to social stimulation in preference to all impersonal stimuli as early as eight weeks (see 27, pp. 556 ff.). At 12 weeks, say Gesell and Thompson, "persons are perceived in a different manner from things" (9, p. 261). There is a photograph by Ch. Buhler in which an infant of 16 months is offering a toy to another infant of 13 months (27, p. 566). This response is possible several months earlier. It seems absurd to suppose that the infant regards the toy as "alive" like his companion. He would never, for instance, attempt to offer the baby to the toy.

We are surprised, therefore, to find that in Russell's results the inability to distinguish between the living and the non-living persists so far into adolescence. Before accepting the conclusions at face value, and especially, as fully corroborating Piaget's theory of children's conception of causality, therefore, it is necessary to consider the possible snare of words.^a When a child responds to Russell's questions by saying that something is "living," just what does he mean exactly by that expression? To us, a living thing is characterized by birth, metabolism, growth, reproduction, sensitivity, death, etc., and, in human beings, by reason and moral con-

^aThe following paragraphs had been written before we saw Russell's fourth article. We keep here the original to bring out the full import of this study.

science Obviously, the child does not mean all that, nobody expects him to But there is one point on which we cannot afford to be ambiguous, i.e., that particular implication the word carries for Piaget's theory. For, to Piaget "animistic" connotes "endowed with will," or, possessed of such properties as to make explanation of the behavior of the thing more natural in moral, motivational, finalistic, and artificialistic terms rather than in physical, mechanistic ones. The crux of the matter is, therefore, when a child says of a watch "It is living; because it ticks," shall we thereupon slip *facilely* into the assumption that he regards the time-piece as endowed with thought, volition, and moral judgment?

Another possible interpretation is that the child means no more than he says. Active functioning, or motion, is taken not as a *sign*, but as a *synonym*, of living It is as if his world is dichotomized, not into the biological and the merely physical, but into the moving and the non-moving.

Just what is really the case is a difficult question, because we are, as it were, dealing with two unknown quantities in one equation If we could only be sure of his usage of the word "living," we should be able to tell what his concept of the particular object is. On the other hand, if we knew his conception of the object, we could then deduce the meaning of his word "living" As things stand, extreme caution is necessary in interpretation.

Pending systematic evidence, the following protocol may be suggestive of a methodology and possible results:

I put a little boy (3 11) through Russell and Dennis's list of objects and some others. Of these authors' 20 objects he granted life only to the watch, the moon, and the zoological items. Although movement played a prominent part in the responses to the following-up question "why," he did not confine himself to it, but said of the non-living objects "It (knife) is whetted by us (= passively handled)"; "It (comb) is only to comb the hair with", "It (chair) is made of wicker", "It has no mouth"; "It cannot eat", "It cannot talk (or bark)", etc

At lunch I tackled him again I said, "Do you know what 'living' means? You are living, I am living, the dog is living, but a stone or a nail is not living Now is the bowl like you and the dog or like the stone and the nail?" "Like the stone and the nail" "Why?" "It is made of wood It has

no mouth and cannot eat" "Is the clock like you and the dog or like the stone and the nail?" He had said before that the clock is living, but replied now, "Like the bowl" "Why?" "It is made of iron" "How about an automobile?" He had declared a while ago, too, that an automobile is living. Now, "Like the stone" "Why does it go then?" "But that is because of the *tools*!" Here his sister (62) interposed with a giggle, "*Engines, not tools*!" Similarly, the boy classified plants as *inanimate*

Changing the line of approach again, I said, "A while ago you wanted to get down from the bed; and then you wanted some rice. Sometimes you want this and sometimes you don't want that Now, does the clock want this and want that as you do?" "No. It is not a man." "Would the clock feel pain if you pinch it?" "No." "Why?" "Because it is hard"

Some months later, I questioned the boy again. He still declared the sun is alive because it goes "Has it life?" "No" "Why?" "Because it cannot die." "Is it the same to be alive and to have life?" "No." "What has life?" "The dog has life A man has life" "What about the sun?" "No life." "Why?" "Because it is in the sky and it is bare and has not anything" "Why did you say it is living, then?" "Because it can walk"

For this child, life is associated not with one but with several phenomena—activity, vocalization, speech, eating, morphological structure, material constitution, etc. While saying that certain things are living, he nevertheless classified them with the stone and the nail rather than with human beings, and explicitly denied them wants and sensations. Further, *living* and *having life* were to him not the same, the latter expression being much nearer the adult's concept Variation of the questioning technique, therefore, is necessary to bring out relevant facts from different angles

As an hypothesis, then, we would suggest that a child's view of the matter consists fundamentally of acquaintance with specific properties and relations of things, while his understanding of the significance and usage of the word "living" is indeterminate. On the basis of the presence of certain phenomena typical of life, such as motion, the child may come to declare a thing as living. This would only indicate, however, that the child has taken into con-

¹In spoken Chinese, the noun form *shing-ming* and the adjective form *huo-te* are not etymologically related.

sideration these particular properties. Inference from these to other vital endowments is extremely precarious. It lies in the nature of the thing, then, that the child's judgment would be variable and inconsistent, depending upon what properties happen to be focal for him at the moment. This, in turn, would depend upon the form of the question, the nature of the explanatory remarks, and various other incidental circumstances.

Incidentally, we have a haunting suspicion that the first concept stage obtained by Russell and Dennis might after all have been in part an artifact. Children in this stage are found to "consider anything as living which is of some use or in good condition, i.e., not broken, damaged, nor separated from its normal context" (38, p. 390). Now, the word "dead" in the standardized question as quoted above seems to us misleading. It might mean more than just "inanimate." It might suggest the idea of "having died."⁸ This possible misinterpretation might have been aggravated by the explanatory illustration given to the child: "*A cat is living but if an automobile runs over it, it is dead*" (*ibid*, p. 392). Now from "having died" one passed to "having been killed or mutilated." A victimized feline is something psychologically quite different from a mere inert object. It might have been in this manner that the younger children were induced to think of dead things as those damaged or put out of function.

In the light of the above remarks, Russell's fourth article (41) requires our closest attention. Russell set out with the question, "Is the development of animism by characteristic stages merely a function of the child's usage of the terms 'living' and 'dead' or is this development actually due to more inclusive ideas concerning the nature of 'life' in general" (p. 83), and proceeded to verify Piaget's investigation of children's ideas of "knowing" and "feeling" and their relation to the idea of animism. Piaget has concluded that, "For children of the first stage, everything that is in any way active is conscious . . . In the second stage, consciousness is only attributed to things that can move. During the third stage . . . bodies that can move of their accord . . . are henceforth alone held to be conscious . . . Finally, in the fourth stage, consciousness is

⁸We are aware of the possibility that this interpretation may be due to our own imperfect understanding of the English usage.

restricted to the animal world" (30, p. 173). The similarity of these to the stages of animism is evident. Piaget compares the children's developmental status in both concepts and finds that 40 per cent of the children belonged to the same stage in both series.

Now Russell standardized a set of questions adopted from Piaget, such as "*Does the ——— know where it is? Why?*" and "*Does the ——— feel when I touch it? Why?*" and put them to 335 school children about the 20 objects, immediately after the examination on concept of animism. The classification of individuals is again found to be clean-cut and reliable. The correspondence between stage in animism and that in these "allied concepts" is found to be 63 per cent, the Coefficient of Mean Square Contingency being 0.75. In contradiction to Piaget's, however, is the result that children were more mature in their allied concepts than in animism.

Inasmuch as a high degree of correspondence between these concepts would indicate that a child who says of a thing that it is living is also likely to say that it knows and feels, Russell's results are appreciated as tending to weaken the force of our argument. And yet, certain reservations seem nevertheless in order:

1. Piaget has given a most pertinent warning on "suggestion by perseveration" (30, pp. 171 ff.) The fact that Russell invariably mentioned the 20 objects in a fixed order and took up the allied concepts immediately after the examination on animism might explain in part the higher degree of correspondence he has obtained.

2. The most important question of will and moral conscience has not been directly covered. It is probable, however, that a parallel procedure may bring out similar results.

3. Any one who has indulged in free exploration of children's thoughts by the clinical method will appreciate how precarious it is to take at par a child's single, isolated statements as indicating his beliefs, especially a bare "Yes" or "No." The danger of words here cannot be over-emphasized. Very often the child's initial response would seemingly give a clear, unambiguous impression. But as the experimenter varies the wording of the questions, changes the angle of approach, or uses a little counter-suggestion, lo and behold! The child would say something entirely different, or something which throws an entirely different light upon his previous remarks and works havoc with our first interpretation. The protocol just

quoted and many others in Piaget's books amply illustrate the point. This is due not merely to linguistic difficulties but also to the fact that the child is being induced to systematize and formulate his thoughts on a question which probably has never occurred to him in just that form. A certain degree of doubt, and hence disagreement among observers, therefore, seem to us immanent and unavoidable. Piaget is so keenly aware of this fact that he goes further and repeatedly emphasizes the impossibility of guaranteeing absolute certainty in individual diagnosis (*ibid.*, pp. 174, 188-189). "Such contradictions," says he, "are of as great interest to the analyst as they are the despair of the statistician" (*ibid.*, p. 190). It is with some puzzlement and concern, therefore, that we find no shade of despair in Russell the statistician. The individual diagnosis is always clean-cut and the agreement among judges always almost perfect. We venture to suggest as a possible explanation that the standardized procedure, by refusing to follow up the child's leads or to vary the questions according to individual circumstances, probably suppresses further responses which might have a disillusioning effect on apparent interpretations. In standardizing a technique one facilitates classification of responses by reducing it to a rather mechanical level, but probably pays the price of over-simplifying inherently complicated phenomena.⁹

But the chief significance of the results of these studies on animism would seem to be that they give us a glimpse of the factors which make for confusion between the living and the non-living by the child, when such confusion does occur. Activity and movement, especially spontaneous movement, are generally speaking the main characteristics of living creatures.¹⁰ When inanimate objects partake of this function, seemingly or in reality, it muddles up the issue. This would seem to show that the animistic attitude is not a generalized, indiscriminate affair, but is induced by certain specific, misleading circumstances in the situation.

⁹We are not unconditionally upholding the variable procedure. With regard to this problem, the clinical psychologist is really between Scylla and Charybdis.

¹⁰In the Chinese language, the term for animals, *tong-wu*, means literally "moving things."

17. *Other Studies*

About the studies to which we have had no direct access, we shall briefly review the bits of information obtainable, for what they are worth.

a. Martha Muchow. We are told by Werner (51, p. 280) that Muchow questioned a child of $5\frac{1}{2}$ years on such topics as why it is dark in the evening and how thunder and lightning come about. The answers show that natural processes were regarded as having not only a physical-spatial, but "in a certain measure" also a human-moral purpose.

b. J. Zawirska (1930). This investigator used on Polish children from 9 to 11 years of age three of Muchow's questions: If a piece of paper is torn into halves, why does the half which has been crumpled fall faster than the other? Why does water in a glass rise when a pebble is placed in the glass? When a glass entirely full of water is covered with a piece of paper and then is turned upside down, why is not the water spilled? Twenty-four children were tested individually and 218, in groups. Four types of response are found: (a) explanation by the succession in time of particular events; (b) animistic and dynamic explanations based on primitive beliefs; (c) mechanical explanations depending on series of reciprocal actions; and (d) explanations based on modern scientific concepts. The fourth class is said to depend on the social and cultural environment (52).

c. W. Illge (1930). Illge asked his students to name certain things which seemed incomprehensible to them and then submitted some of these to 12-13-year-old pupils. Their answers cover a wide range, from explanations depending upon magic similar to primitive explanations to those which are scientifically correct (15)

d. E. Becher (1933). Seventy-six children from 5 to 14 years were questioned regarding such concepts as sickness, death, mind, and nutrition. A fairly definite developmental sequence is found which consists of four principal stages: (a) "if-then" thinking, a mere statement of conditions and consequences; (b) religious and fairy-tale theories, (c) magical theories; and (d) realistic theories (2)

In all preceding studies no quantitative data are obtainable from

the abstracts and quotations to help us judge the relative prevalence of the animistic and magical explanations. Even less are we able to determine the criteria of classification.

e. *V. Lichtenberger*. The children were told stories which were left for them to finish by drawing illustrations. The stories were such that the continuation required the statement of a mechanical effect of a previous set-up (such as the fall of an apple thief who sat on the branch he was chopping off). It was found that in comparison with a control group of normal children the abnormal children of special classes mentioned much more rarely the mechanical implications than the emotionally colored consequences of the represented situation, such as flight and punishment of the wrongdoer (42). It seems to us that this shows more the social outlook and orientation of interest rather than the physical understanding of these children.

f. *Angeline M. Keen* (1934). Some idea of Miss Keen's unpublished work (18) is obtained from Mrs. Deutsche's monograph (8). In typical fashion Miss Keen went about to measure causal thoughts as an *ability*, employing the multiple choice testing technique and having the (prescribed) responses converted by rating according to their scientific correctness into quantified scores. She used a large number of subjects, in groups excepting the youngest. All sorts of correlations were worked out.

We should like only to note the difference in principle between an evaluative, quantitative measurement of this nature and a descriptive, qualitative investigation of children's conception of causality with which this article has been mainly concerned. Neither is a substitute of, or improvement over, the other. Miss Keen's point of view seems to us to resemble that of the usual school examination or achievement test, where the amount of correct information is to be ascertained. In a qualitative study of the child's causal concept it is not sufficient merely to designate a response as "right" or "wrong" or to award for it a greater or smaller number of points, the all important question is *what the child does think* about the matter, and what characteristic mental outlook it reveals. From the evaluative point of view, development will always manifest itself in the responses becoming more and more correct and the scores growing arithmetically larger and larger, but whether or

not the child passes through an animistic view of nature to a materialistic one, for instance, is a point more likely to be obscured than clarified by quantified ratings. Similarly, the concept of "ability," is not always relevant in all such studies, for any peculiarity in childish thinking may be a matter of outlook and orientation rather than one of ability.

However, despite the difference in point of view, Miss Keen agrees with us that magical, moral, finalistic, and animistic answers are very rarely found (8, p. 56). "She finds no evidence of a difference between subjects of different ages as to the method used in formulating experiences, but does find differences in the amount of previous knowledge and experience upon which they have to draw and in the organization and systematization of that information. She discovers no evidence of consistent stages of development" (*ibid.*, p. 6).

g K. Zietz (1936-1939) Zietz presented questions similar to Piaget's, informally and incidentally, to several hundred 10-14-year-old boys in his science classes over a period of three years, in Hamburg (54-56). The records show that *naïve theories* (e.g., electric current is a "flow of sparks," "the rotor rubs the magnet of the motor and creates heat,") are persistent and tend to survive in spite of school instruction. The child early grasps from experience the principle of *practical causality* and applies it to natural phenomena in general by an immediate, uncritical expansion of his restricted world. Then there are, as Piaget found, the *circular theories* in which cause and effect are reversible and indistinguishable, outgrown only by the 14-year-olds. The child repeats the history of development of theories of science, the similarity with Aristotle's theories is particularly striking. There is no mention in the abstracts of mystical or anthropomorphic explanations.

B. SUMMARY AND DISCUSSION

1. *The Child's Dominant Conception of Physical Causality*

That children *sometimes* explain natural phenomena in anthropomorphic (or animistic), dynamic, and magical terms seems well supported by biographical and experimental data.

But, a careful survey of the literature shows that, instead of being the typical, prevalent, and universal modes of children's think-

ing before seven or eight years of age, as far back in the child's life as he is accessible to direct investigation, these forms of causality are, as Mrs. Deutsche puts it, "conspicuous by their rarity." In the works of those whose emphasis is on the importance of such special type of causality for young children, as Raspe, Herzfeld and Wolf, Zeiniger, Werner, and probably Muchow, Zawirska, Illge, and Becher, naturalistic and phenomenalistic thinking is admitted to coexist in large measures. Although the exact extent of the incidence of magical and animistic forms is often not specified, there is no reason to assume that they are predominant. On the other hand, Isaacs, Johnson and Josey, Mead, Keen, Deutsche, and Huang and his collaborators have found them quite atypical and negligible in frequency. Clear evidence of *participation*, particularly, is so little found or mentioned by other investigators than Piaget that its existence, apart from the interpretation of all magical, certain *phenomenalistic*, and certain other, *ambiguous explanations* as logically implying such a mode of thinking, is rather doubtful.

The concrete samples given by Isaacs, Huang, and Huang *et al.* illustrate plainly the kind of ideas characteristic of the child's everyday conceptions of reality and causality. They may be simple, naïve, and incorrect, but they are physical, naturalistic, and of the same warp and woof as the "physical" conceptions of the everyday man in the street.

The results of that type of experiments inspired by Köhler's work with apes, as applied to children (e.g., 1; 6, pp. 47 ff.), may be taken as having proven from another angle children's early mastery of certain fundamental spatio-physical relations. In fact, much of the work on problem solving in animals goes to illustrate the reality of insight into physical causality in the lower species. *A fortiori*, why not in the child?

Genuine moral control of behavior has never been shown to occur in infra-human subjects. Magical practices, likewise, are not observed among them. Nor is there any evidence that they see any difference between man-made objects and natural ones—i.e., show any appreciation of the former as such. But they do adjust themselves adequately to many physical properties and relations. Phylogenetically, then, simple physical concepts would seem to be of a lower order of achievement than moral, magical, and artificialistic

concepts. There is no reason why ontogenetically the reverse should be the case.

Causal concepts of whatever form evidently cannot have existed preformistically but must have developed in the individual's commerce with environmental realities. Piaget has repeatedly expressed the view that the mind develops in the continuous process of mutual adaptation between the organism and environment (see, e.g., 30, p. 241, 31, pp. 272-273; 33). Animism, moralism, and artificialism are so obviously modelled after animate and social ways that they can have come into being only through actual experience with them. It is fully admitted that the child would have ample opportunity to develop such schemata, and would tend to apply them whenever the occasion arises. But the question is: Does he not begin equally early to have contacts with inanimate things with their own characteristic properties and is not such experience just as real? Let us recall that form of play activity known as "sensori-motor experimentation" which begins in the earliest infancy. "As soon as the child can hold anything," said Stern, "that is then, after three months, the play with objects begins." He went on to show how in a thousand ways the child "gives himself a little lesson in physics and geometry" (43, p. 98). Similarly, Gesell and Thompson say of the third quarter of the first year of the infant's life, "This is the period in which through ceaseless prehension and manipulation he acquires his groundwork of physics; his acquaintance with the most elementary properties of things" (9, pp. 289-290). We have voiced our incapacity to understand how in the midst of all this he could possibly have escaped assimilating the rudiments of everyday physics into the foundations of his thinking (13, p. 129). A similar sentiment is expressed by Miss Isaacs, thus: "The child makes a partial discovery of the limits which the physical world sets to his activities surely almost as early as he comes to know other human beings as persons. The disappointments and sense of impotence which *things* force upon him are as much a part of his education as the denials and thwartings suffered at the hands of adults. The burnt child dreads the fire even in the stage of egocentrism" (16, p. 79). It seems only reasonable, therefore, to assume that experiences with inanimate objects are equally effective in producing mental structures of a distinctly physical sort.

A child's concepts regarding reality are not mere idle speculations removed from real life, but are assumptions or "sign-gestalt-expectations" which guide and direct behavior in an uncompromising physical world. Radically unsound ideas would sooner or later land their possessor into actual difficulties, giving rise to disruption of behavior and shaking him out of his egocentric fancy. One of the chief functions of the *law of effect* is just this corrective influence on the structure of one's "behavioral environment" (20, p. 645). Tolman has shown how "docility," or the capacity for reorganization of cognitive processes in adaptation to environmental realities, is characteristic of the rat (48). The human child cannot be far behind the rodent in this respect for seven or eight good long years.¹¹

We see no reason, therefore, either factual or theoretic, to accept the view that for the first seven or eight years of human life the concept of reality and causality is typically mystic and animistic.

2 *Conditions under Which Animistic and Magical Explanations Obtain*

But, inasmuch as animistic and magical explanations do sometimes occur, it becomes necessary to ask when and why they do. In the following pages some answers will be considered.

a Age Criticism of Piaget's theory often takes the form that he dates the beginning of valid views of the world much *too late*. The logical implication of this would seem to be that in the course of mental development there is actually a period which is characterized by prevailing mysticism and animism, only its temporal locus is further back in infancy than Piaget has assigned it. In line with this interpretation might be recalled such data as quoted above from Deutsche and Heizfeld and Wolf, wherein the general trend is, the younger the child, the greater the percentage of magic and animistic explanations found.

It must be pointed out, in the first place, that, thus far the systematic studies rarely include children younger than four or five

¹¹This argument probably holds equally good for primitive peoples. The practical demands of life will always insure a fair degree of mastery of practical physics, irrespective of race and culture, whatever other beliefs may be entertained with regard to such uncontrollable and incomprehensible things as chance and accidents, disease and death, war and the chase, the weather and the heavenly bodies, and the origin of the universe.

years. And in even the youngest of those interviewed, in so far as clear responses have been successfully obtained, physical conceptions seem to be well established. Just what the situation is for children of two or three or younger, we have only a few diary anecdotes to fall back upon. Any attempt to picture causal thinking at this stage is a matter of speculation.

An alternative view to the above is that there never has been a period of pan-animistic causality. The somewhat greater percentage of non-physical explanations for the younger children may well be otherwise accounted for. There is first the linguistic factor. The younger child's responses are typically vague, elliptical, and equivocal. Many of them take forms which lead the investigator to classify them as dynamic and animistic, but may in reality be only a *façon de parler* on the child's part and do not necessarily imply such views. Then there is subtle difference between a positive belief and the absence of contrary beliefs which preclude it. "The child doesn't believe, for example," says Mr. N. Isaacs (16, p. 108), "that 'everything is alive'; he simply doesn't *know* that everything isn't alive." Or, as we have expressed it elsewhere, "more is allowed as possible and less is prescribed as necessary" by the younger child (13, pp. 117, 119). It is to be expected, therefore, that a certain greater proportion of non-physical explanations will be offered or tolerated by the younger subjects, without their actually entertaining a world-view of a definitely animistic nature.

Experimenters do not take up the youngest child, for the simple reason that it cannot be done. When closely questioned, he is bewildered, answers at random, and seems entirely at the mercy of suggestion. His responses are ambiguous, inconsistent, and unconvincing. It is impossible to pin him down to a definite statement which one can conscientiously accept as representing his belief. The picture presented is not one of mystic precausality, but the *absence of any definite idea*.

The characteristic thing about the young child may be just the inability to appreciate the problem of efficient causation as such. Thus several investigators have noticed the fact that the younger ones tend, in lieu of giving a true explanation as called for, to narrate the events as they have experienced them. Heitzfeld and Wolf (12) found that the percentage of children who gave no

explanation but reported the facts as such, increased as age decreased. In Heidebreder's study of "*Reasons used in solving problems*," many of the younger children described *which box* they had chosen, rather why they had chosen it (11). Werner probably has something similar in mind when he characterizes primitive and childish explanations variously as "mostly narration and description," "the historico-perceptual presentation of a process," and "the description of a unitary course of events as experienced" (51, Sections 41 and 42). Thus maybe it is a mental orientation not directed toward the causal problem, with the result that he has no definite ideas about it, rather than a pan-animistic world-picture, which characterizes the infant.

b Intelligence Difference in the *IQ* or mental ratio of the children studied has been suggested by Miss Isaacs (16, p. 96) and Johnson and Josey (17, p. 339), albeit not too enthusiastically, as a possible explanation of the difference between their results and Piaget's. However, to the extent that an atypical *MA* corresponds to the mentality normal for a different *CA*, as is commonly assumed, the above discussion on age would apply with full force. At all events, there is no ground to believe that, apart from the generally better performance to be expected of brighter children, naturalistic conceptions are restricted to children of higher intelligence.

c Individual histories. Zeining's typological theory regarding magical thinking is supported by Blachowski. Whatever be the full implications of the theory of "types," descriptively it expresses the fundamental proposition that the tendency to magical thinking is to a great extent a matter of individuals. Whether or not, again, there is a factor of constitutional predisposition, it seems safe to say that such personal differences arise from the specific developmental histories of the individuals, the course of which is subject to the influence of all sorts of conditioning circumstances. As illustration we may cite Ter Keurst's study of superstitious children (46) whose individual histories present a picture of handicaps and inadequacies. The influence of *imitation* is shown by Blachowski (3).

d The cultural milieu. Of the environmental factors affecting individual development one would expect the cultural status of the community to play a large part. And yet, that *race* does not appear to play a decisive rôle is shown almost with a vengeance in Mead's work (25, 26). Whereas the Swiss children furnished Piaget the

material for his striking theory, Mead's South Sea Island aborigines were stubbornly practical and naturalistic Chinese, American and English children definitely side with the latter.

Further, Deutsche (8) and Huang *et al.* (14) found little difference corresponding to the socio-economical status of the children within the same national group.

This can only support our view that the basic, practical demands and opportunities of everyday life, which cannot be too radically different for all racial and social groups, are sufficient to impose a fairly valid conception of such physical events as are involved in these experimental studies.

In the case of specific, isolated superstitions such as those investigated by Ter Kuust (45), the dependence on traditional transmission seems much more to be expected.

e. Method of study Instead of seeking the cause of animistic and mystical thinking in the relatively permanent *classification* of the child, we shall now pass on to the consideration of the *situation* or *occasion* on which such thinking is most likely to be met with. This seems to us the more fruitful approach.

We have mentioned Mrs. Isaacs's suggestion that Piaget's findings might be due to the inadequacies of the clinical method. In a similar strain, Mrs. Deutsche thinks this method "encourages guess work and flights of fancy" (8, p. 92). The best answer to this interpretation is the fact that Johnson and Josey as well as Huang and his collaborators using this method have obtained results very similar to Isaacs's and Deutsche's and very different from Piaget's. If anything, the laboratory method, especially when centered around some concrete demonstrations, tends to impose an intellectual atmosphere, free from the affective and personal moments which often taint the natural, everyday outlook on the world.

f. The subject matter of the question. One of the major determinants of the character of the child's response is undoubtedly the subject matter of the question itself. Zeiningel, as we have seen, contrasts the incidence of magical and realistic explanations regarding tadpoles and meteorological phenomena (53). "Two Parents," likewise, emphasize the rôle of experience and understanding (49). It has also been suggested that Piaget seems to have gotten "the evidence for his theory best in connection with interrogations re-

garding the behavior of clouds, heavenly bodies, rivers, and other things in nature, which are favorite subject-matter for fancy, mythology, and fairy-tales" (13, p. 178)

That familiarity is a significant factor seems readily understandable. Everyday articles and processes are not likely to be conceived non-physically, because all their ways are well known, whereas with unfamiliar things anything seems possible, because there is no definite knowledge to the contrary.

Another important principle of discrimination is suggested by the scarecrow. The birds avoid coming near it as if it were the jealous farmer himself. One could forthwith make out a good case of animism in the Aves. But the true explanation is undoubtedly in the fact that the scarecrow looks like, shows certain phenomena similar to those of, the man, and the poor birds have no way to tell the difference. In the same manner we used to mistake the whale for a fish. We submit that a child manifesting animism is in the same position as a bird in the presence of a scarecrow. The more anything partakes of 'the typical properties of living things, the more likely it would be for it to be taken animistically. Motion, especially spontaneous motion, is perhaps the most important. In addition we may suggest the "physiognomic characters" so much emphasized by the Gestaltists. As a "naive realist" (21) the child probably sees and accepts unquestioningly many more such expressive appearances than we do.

Both Keen (18) and Deutsche (8) express the fact that the child's idea of causality depends on the subject-matter, by saying that the correlation between different questions is low, and that abilities of causal thinking are specific. The above discussion locates the specificity, not in the pattern of organization of human faculties, but in the particular properties of the thing and the particular experience the child has had with it.

g. Imaginative vs. realistic moods. The realm of phantasy and wishful thinking is to be carefully distinguished from the realm of intellectual understanding. Every student of child mind knows how prone the child is to create for himself a world of playful make-belief. Whereas it is to be fully admitted that, while about it, the child gives himself up to *living* the fancied experience with the greatest abandon and earnestness and that he passes from this world

to the world of reality, and *vice versa*, with greater readiness than adults do, it is nevertheless not to be supposed that these imaginative activities are identical with his intellectual beliefs regarding reality. This distinction has been ably drawn by Isaacs (16, pp. 106 ff.). Karl Buhler emphasizes the same idea in his treatment of "illusory games" of childhood (6, pp. 93-94). "The child rarely confuses the reality of play with the reality of life," he says, "in spite of this active inner participation." Buhler's hypothetical case that "the little player would nevertheless get a big shock if the doll he is trying to calm really began to cry, or if any toy really carried out the imaginary motions," was fully proved in the record quoted above of the child of 1;11 confronted with a mechanical toy elephant.

Much of the so-called magical causality is probably of the nature of wish-fulfilling phantasy. Particularly conducive to such thoughts and practices are naturally situations which inspire feelings of fear, anxiety, and hope, just as Blachowski has found in school pupils (3). Where personal stakes are heavy and the outcome is uncertain and beyond control, the "civilized adult," as well as the child and the primitive, is tempted to indulge in superstitious ideas and magical rites as the expression of the wish. But such autistic thinking does not represent one's prevailing conception of everyday reality.

h. The investigator as a factor. We come now to an odd but striking fact. Practically all the studies in which the emphasis is on the presence or importance of mystical thinking in children are from the European continent and practically all Anglo-American studies (with the notable exception of Russell's series) tend the other way.

i. Interpretation of data. This brings us to the further point that much of the mysticism claimed is a matter of interpretation, which is not always warranted (see, e.g., cases analyzed in 13, pp. 107, 144-147, 150). Other writers, especially Isaacs and Deutscher, have made similar complaints.

Related to this readiness to read mysticism in the child's responses may be discerned two tendencies: (a) An eagerness to see a close parallel between the mind of the child and that of the primitive, especially as pictured in Lévy-Bruhl's theory. (b) An inclination to

find systematic coherence in the child's inconsistent responses. The psychologist bent on finding the child's cosmological creed would look deeper for some underlying conception which has to be there in order that the child's contradictory statements may fit together logically. The result often shows more the ingenuity of the scholar than the mentality of the child. It seems a much safer policy to accept lability and inconsistency as the true characteristics of childish responses and attempt to understand them as such (13, pp 118, 155, 160 f.)

The upshot of this analysis is that anthropomorphic, magical, and other non-physical causal concepts are not necessary or general stages in the development of the child's mind, but are relatively rare occurrences obtaining under a certain limited range of special conditions.

3. *Conclusions*

From the survey of the (mainly) experimental literature, we have found it impossible to accept Piaget's theory that all through the preschool age the child's causal thinking is all animism and mysticism and no physicalism. Instead, simple and naive physical concepts, comparable to those of the everyday man in the street, seem to be definitely established and predominant even for the youngest of the children studied. Since all agree that mentality develops in intimate relation with experience, and since experience includes from the very beginning inanimate objects, the nature and *raison d'être* of any inner weighting factor which puts a premium on the animistic structures as against the physical structures seem difficult to understand.

Cases where nature is anthropomorphized are readily understandable as errors which are due, negatively, to the absence of contrary knowledge, and positively, to the presence of properties generally accepted to be characteristic of living things. A plurality of other factors, naturally, may favor or hinder the animistic attitude. It seems objectionable, further, to style animistic explanations as "mystic," "prelogical," and "precausal," with all the abstruseness these words carry. Child animism simply means ideas obtained from the biological and social spheres misapplied. Where applicable, we agree with Stern that anthropomorphic explanations are, in a com-

mon sense way, true and comprehensible explanations (43, p. 410)

Regarding the causal thinking of the child before four or five years of age, adequate data are not available and discussions are speculative. Although we would not hesitate to accept the principle of *differentiation* on general grounds as a valid concept in mental development, it need not necessarily lead to Piaget's interpretation of it. In his theory causality seems at the beginning all too subjectively conceived. It is true that phenomenalism is regarded as coexisting with magical causality from the very beginning and it is said to signify objectivism at the maximum. But phenomenalism is hardly physicalism. And the author hastens to add that it is essentially unstable and readily transforms itself into animistic, dynamic, or magical relations. He "even wonders whether the phenomenistic relation would exist if there were not other forms of relations to support it" (31, p. 260).

In our understanding, on the other hand, the process of differentiation should start from some neutral and indeterminate state which is neither animism nor physicalism, and then proceed by the gradual appearance and definition of both, rather than from one to the other. There are indications that the younger children are characterized by having no definite causal ideas and perhaps by being not causally concerned in their mental orientation.

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AGE, SEX, METHOD, AND INTERVAL AS VARIABLES
IN TIME ESTIMATION*

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Relatively few studies have been made concerning the ability of children to estimate short intervals of time. Elkins (1) had 152 Odessa children from 10 to 16 years of age estimate intervals from five seconds to five minutes in length. The average error for the youngest group was 4.1 seconds or an 82 per cent error for the shortest interval and 170 seconds or a 57 per cent error for the longest interval. The 16-year-old children made an average error of 1.6 seconds or a 32 per cent error for the shortest interval, and a 91 seconds or 30 per cent error for the longer interval. In general both groups underestimated the longer intervals and overestimated the shorter intervals.

Harrison studied the development of the concept of time in 160 children chosen from the kindergarten and the first three grades. She did not have the children estimate time but had them answer a series of 50 questions taken from eight vocabulary studies. These questions investigated the knowledge of the children concerning the time of day, the length of the day and month. She found that there was a rapid increase in the development of such time concepts from kindergarten through the third grade. The percentage of what she considered complete comprehension of these concepts for the kindergarten children was 22. It was 29 for the first grade, 43 for the second grade, and 60 for the third grade.

In the present study the time judgments of 48 fifth grade children were compared with the same number of college students. With both groups three types of judgments were employed: estimation, production, and reproduction. In estimation the subject was required to guess in seconds various lengths of time as marked off by the experimenter. In production the procedure was reversed, the subject marking off for the experimenter stated time intervals. In reproduc-

*Received in the Editorial Office on November 15, 1941

tion the subject had to mark off for the experimenter lengths of time (absolute length being unknown to *S*) previously marked off by the experimenter.

The apparatus for indicating time intervals consisted of two electric clocks, one controlled by the experimenter and the other by the subject. The clocks were concealed from the subject by means of a screen placed between him and the experimenter. Control keys for starting and stopping the clocks were connected with a sounding device which signaled the beginning and end of the intervals measured. In addition the experimenter could send out another signal which was here given one second before the clock was started as a warning sign to attract the subject's attention. Two silent control keys were also present so that the experimenter could set the clocks preceding each judgment.

The subjects were required to make a judgment on each of eight different intervals presented in random order using one of the three methods defined above. The intervals, ranging in length from 9 to 180 seconds, were ordered in a logarithmic series (9, 14, 22, 33, 50, 76, 117, and 180 seconds). If time judgments follow the Weber-Fechner function, the degree of error would be a constant proportion throughout the range of judgments. Thus by using a logarithmic series, the intervals to be judged would be psychologically equidistant.

Directions were essentially equivalent for all, but for the children the wording was simpler and repetition was frequently found to be necessary. In addition to instructions concerning the type of judgment to be given, half of the subjects were asked to count the seconds as they passed and the others were requested to refrain from counting. It is, of course, impossible to know certainly whether or not the subjects followed the instructions concerning counting; but judging from the introspections of the subjects and the differential results, the majority must have cooperated in this respect. The sexes were equally distributed under all conditions. Before each series a 10-second and 150-second interval (for half the group the order was reversed) were marked off for the subject by way of demonstration. This technique afforded two practice trials so that it was certain that the directions were understood, and also it gave the subject some warning as to the relative lengths of time he would be expected to judge.

To treat the results the per cent of error for each judgment was calculated by dividing the error by the length of interval judged. From the distribution of per cents three different measures, arithmetic means, algebraic means, and standard deviations, were computed. Table 1 presents the mean amount of error and the per cent of error for children and adults.

TABLE 1
SHOWING MEAN ERROR AND PER CENT OF ERROR FOR EACH TIME INTERVAL

Interval	Children		Adults	
	Mean error	Per cent error	Mean error	Per cent error
9	4.28	47.5	2.81	31.2
14	6.16	44.0	3.91	27.9
22	9.49	43.1	6.31	28.7
33	12.74	38.6	7.31	22.1
50	16.33	32.7	9.42	18.8
76	26.07	34.3	12.90	17.0
117	41.64	35.6	21.03	18.0
180	57.69	32.0	26.65	14.8

From this data it is evident that the children used in this experiment made much smaller errors than the Russian children used in Elkin's experiment. It is to be expected that American children from well-to-do homes would have had more experience in time estimation than Russian children from workers' homes. But our adults made much smaller errors than the children. Adults are much more often called upon to make judgments of time than children.

In addition to the factor of (*A*) age the subjects were equally divided between (*B*) males and females. Two techniques of judging were used. In half of the judgments the subjects used (*C*) silent counting and in the other judging no counting was permitted. Three different methods of judging were used: (*D*) estimation, production, and reproduction, and finally (*E*) the four longest intervals were compared with the four shortest. Four of the above variables were varied in two ways and one in three ways. This yielded 48 different experimental conditions.

In order to test the significance of the differences between the judgments for these 48 conditions, the data were arranged in accordance with Fisher's factorial designs. Three analyses of the data were made based upon the arithmetic means, the algebraic means,

and the standard deviations. All five variables were present in each analysis.

Because two scores from each person were used, it was necessary in computing F ratios to use a different estimate of error than usual in order to take account of the resulting correlation. The error variance used for variables A , B , C , D , and their interactions we shall speak of as the error variance between individuals. It was obtained by summing the scores for each subject, the variance within the individual or between paired scores thus being cancelled out. The error variance used for Variable E and its interactions we shall call the error variance between paired scores. The sum of these two error variances equals the usual estimate of error.¹

The results of the first analysis, presented in the first part of Table 2, are based on the arithmetic means of the per cent error. The arithmetic means is the usual measure in psychophysical experiments of the absolute error. The started values of F exceed the 1 per cent point: 1 per cent for 1 degree of freedom = 7.1, for 2 degrees of freedom = 5.0. This indicates a probability of less than 1 per cent that differences this large for the variables in question could have arisen by chance, or, in other words, by conservative standards these started variables contribute significantly to the total variability.

The variance due to A indicates that adults on the average make considerably smaller errors than fifth grade children. From C we can conclude that errors are significantly smaller when the subjects are allowed to count. Since there is no interaction between A and C , the advantages of counting are as great for adults as for children.

The F value for variable D barely exceeds the 5 per cent point (5 per cent = 3.2 when $n = 2$) so that no definite conclusions can be drawn concerning the differences between types of judgments. Inspection of the two-way table, however, shows that reproduction tends to be easier than either estimation or production. This is possibly due to the fact that reproduction scores are not distorted by an incorrect idea as to the length of a second.

That the per cent of error in judging long intervals is less than in judging short ones is reflected in the large F value for Variable E .

¹We are indebted to Dr. Lloyd G. Humphreys for this particular procedure.

TABLE 2

Source of variation	Arithmetic mean scores			Algebraic mean scores			Standard deviation scores		
	Σ of squares	Degrees of freedom	ance	F	Σ of squares	Degrees of freedom	ance	F	Σ of squares
Age	10208	1	10208.0	13.13*	1319	1	1319.0	3739	1
Sex	63	1	63.0		6936	1	6936.0	180	1
Technique for judging									
Method of judgment									
C	9263	1	9263.0	11.94*	192	1	192.0	8373	1
D	5559	2	2779.5	3.58	4460	2	2230.0	235	2
AB	850	1	850.0	1.09	668	1	668.0	3	1
AC	234	1	234.0		3852	1	3852.0	457	1
AD	129	2	64.5		7616	2	3808.0	65	2
BC	379	1	379.0		1334	1	1334.0	324	1
BD	1919	2	959.0	1.24	4864	2	2404.0	402	2
CD	2353	2	1176.5	1.52	20728	2	10364.0	670	2
ABC, ABD									
ACD, BCD									
ABCD	3458	9	384.2		3493	9	388.1	1390	9
Error between individuals	55910	72	776.5		160345	72	2227.0	31909	72
Length of interval									
E	4218	1	4218.0	10.13*	14145	1	14145.0	32.41*	1398
AE	67	1	67.0		2160	1	2160.0	4.95	67
BE	114	1	114.0		792	1	792.0	1.81	132
CE	168	1	168.0		252	1	252.0	67	1
DE	404	2	202.0		7221	2	3610.5	827*	858
ABE, ACE									
ADE, BCE									
BDE, CDE									
ABDE, ABCE									
BCDE, ACDE									
ABCDE									
Error between paired scores	29971	72	416.3		31423	72	436.4	13932	72
Total	131170	191			277702	191		67248	191

Thus it would seem that in this range judgments of time intervals do not adhere to the Weber-Fechner formula (3).² Another demonstration of this can be seen in Table 1. Here the mean absolute errors and the per cent error for each interval are presented. It is apparent that except for a few insignificant reversals the per cent of error decreases consistently for both children and adults with an increase in the length of the interval judged.

If, in accordance with the findings of the preliminary experimentation, the difference in ability between children and adults were a function of the type of judgment, a significant interaction variance should be present between Variables *A* and *D*. This interaction was not found, however, since the adults were superior to the children in all judgments and in approximately the same degree.

Using the algebraic mean of the per cent of error, we obtain an estimate of the constant error involved in time judgments (see the second part of Table 2). The most significant difference in constant error is between long and short intervals (Variable *E*)—short intervals tending to be overstated while longer durations are underjudged. The significant interaction *DE* and the interaction *CD* which exceeds the 5 per cent point (5 per cent = 3.2 when $n = 2$) are probably reflections of the fact that over- and underestimation are not entirely comparable with over- and underproduction. To overestimate an interval is to think a second shorter than it really is; to overproduce an interval is to think a second longer than it really is. The process of reproduction is ambiguous in this respect since knowledge of the absolute length of a second is not necessary for a successful judgment. For this reason algebraic mean scores are not very satisfactory.

One other interaction *AE* which, however, only exceeds the 5 per cent point (5 per cent = 4.0 when $n = 1$) may be mentioned. Inspection of the two-way table indicates that this interaction is due to the fact that children tend to make greater underjudgments on the long intervals than do adults, while for short intervals the overjudgments are approximately equal.

The analysis based on standard deviation scores (Table 2) yielded

²This is contrary to the results obtained by one of the authors in an earlier study. In this earlier study the intervals ranged only from 4 to 27 seconds. This seemingly was too small a range to test the Weber-Fechner law.

three significant values of F . From Variable A we can conclude that children are more variable than adults. From C it can be seen that counting reduces the variability. And from E it can be concluded that judgments of the short intervals show greater variability than judgments of the longer intervals. This is to be expected since the per cent of error is also considerably greater for the short intervals

SUMMARY AND CONCLUSIONS

A comparison was made between the ability of 48 fifth grade children and 48 college adults in estimating, producing, and reproducing eight short intervals of time ranging in a logarithmic series from 9 to 180 seconds. Half of each group were allowed to count the seconds while the other half were instructed to refrain from counting. The sexes were equally divided under all conditions.

Per cent of error for each judgment was calculated and these scores were averaged arithmetically and algebraically and standard deviations computed for the four short and the four long intervals. Three analyses of the data based on the above computations were made in accordance with Fisher's technique for the analysis of variance. Different estimates of error than customarily employed were used because two scores were obtained from each individual.

The following conclusions can be drawn from this study.

- 1 Adults are distinctly superior to fifth grade children in judging the length of short intervals of time whether the judgment is by estimation, production, or reproduction of the intervals. The adults are from 15 to 18 per cent better than the children in all the intervals used in the experiment. However, the fact that the children are as successful as they are indicates that they have already developed certain cues for time estimation. Just what these are we do not know.

- 2 Like other recent studies no significant sex differences were found.

- 3 Counting proved to be an important aid for both children and adults in time judgments.

- 4 Reproduction of time intervals is perhaps easier than estimation or production, but they all seem to be closely related mental processes.

5 The per cent of error and the variability are greater in judging short than in judging longer intervals. Time judgments do not seem to follow the Weber-Fechner law.

6. Short intervals tend to be overestimated while longer intervals are underestimated.

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DOES A PHYSIOLOGICAL CORRELATION EXIST BETWEEN BASIC INTELLIGENCE AND PHYSICAL EFFICIENCY OF SCHOOL CHILDREN?*

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A PROBLEM

For some years we have been engaged on an extensive experimental survey of physical efficiency and standards of fitness of various racial and age groups of the South African population. When we commenced our studies on this subject (1934), little, if any, exact information was available on the growth of the three basic muscular performance components of human labour: skill, strength, and endurance. In the meantime it has been possible to outline the normal curve of growth of physical efficiency in school children. Data have been assembled concerning the physiological performance standards and the educational potential of adult men and women. Finally, we have collected much evidence regarding many differential features of physical efficiency of various racial groups such as Europeans, Bantu, Coloureds, Indians, and Chinese.

An attempt was made (Jokl and Cluver, 1941, Jokl, Cluver, Goedvolk, and de Jongh, 1941) to place the physiological evidence collected in the course of our experimental surveys in its proper social and economic perspective. *We regard physical efficiency as the most important basic determinant of human labour value.* Education and occupational instruction can and must develop the "raw material" of the untrained individual into the "finished product" of the trained worker. This process of transformation actually constitutes the most important step in the organization of a well integrated society capable of achieving a high level of production. In order to perfect this process we must have exact information on physiological standards of physical efficiency, and on the educational potential which can be developed through training.

*Received in the Editorial Office on January 14, 1942

It is virtually impossible to look upon intellectual or physical efficiency as isolated constituents in the complex whole of the human personality, although it is possible to express intellectual or muscular performance as measured quantities.

In this paper we report the results of a study aiming at analyzing the relationship between the two basic determinators of human efficiency: intelligence and physical performance standards. We have correlated the results of intellectual and athletic as well as other physical performance tests.

B METHOD FOR THE DETERMINATION OF INTELLIGENCE QUOTIENTS

Intelligence quotients of 202 girls of between 11 and 17 years of age were ascertained with the help of the South African Group Intelligence Test. This test is designed for children from 120 to 192 months of age. It consists of a battery of seven sub-tests, namely a "Classification" test, an "Analogies" test, a "Number Series Completion" test, a "Story Completion" test, a "Letter" test, a "Same-Opposite" test, and a "Figure" test. The norms underlying this test were calculated from the performance of 16,574 children, 45 per cent of whom were from large urban areas; the others came from towns, villages, and farms of most parts of South Africa. The norms were analyzed and presented on monthly age bases, and tables are provided whereby a child's percentile rank may be read off immediately.

These tests were used by the psychological section of the Carnegie Commission to investigate the Poor White problem in South Africa. (For a detailed account of the tests see Wilcocks, 1932.)

C. METHOD FOR THE DETERMINATION OF PHYSICAL EFFICIENCY

For the measurement of physical efficiency we have followed the standard method introduced by Jokl, which allows of the separate assessment of skill, strength, and endurance. This method is based on the physiological classification of the effects of training as introduced by Steinhaus in his classic monograph on the "*Chronic effect of exercise*" (1933). It can be taken for granted that tests of skill, such as sprinting, reflect the basic motor differentiation of the nei-

vous system, that tests of strength, such as putting the shot, roughly reveal the state of physique and of muscular development, and that endurance tests, such as 600 yards running, indicate the standard of fitness, or perhaps rather the functional potential, of respiration and circulation.

Every performance was measured in accordance with accepted athletic procedures (Jokl, 1940).

D. STATISTICAL METHODS

The figures were sorted into Physical performance/Intelligence quotient correlation tables, keeping each age group separate, for each of the three types of physical tests. Students under the age of 12 were grouped with those of 12 years, and students over the age of 15 with those of 15 years.

The Physical Performance figures for the 100 yards, 600 yards, and shot put were divided into class intervals of 0.5 of a second, 5.0 seconds, and 10 foot respectively, and the Intelligence Quotient figures were divided into five unit class intervals.

In the 600 yards race, large numbers of students "gave up" and these were arbitrarily given performance figures of one class lower than that of the worst performers who did complete the race; e.g., in the 15-year-old group, 13 girls out of a total of 33 "gave up," and these were placed in the 3 min 15 sec. class, being the class five seconds slower than that of the slowest measured time of girls who did finish the race.

Coefficients of correlation were then obtained, the following formula being used.

$$r = \frac{\sum xy}{N \sigma_x \sigma_y}$$

- Where
- r = coefficient of correlation
 - $\sum xy$ = sum of the cross products
 - N = number of observations
 - \bar{x} = mean of Physical Performance figures on arbitrary scale
 - \bar{y} = mean of Intelligence Quotient figures on arbitrary scale
 - σ_x = standard deviation of Physical Performance figures on arbitrary scale
 - σ_y = standard deviation of Intelligence Quotient figures on arbitrary scale

The coefficients of correlation (Table 1) ranged from:

—018 to —156 in 100 yards
 —.290 to .144 in 600 yards
 —255 to .155 in shot put.

TABLE 1
 COEFFICIENT OF CORRELATION

Age in years	Shot put IQ	600 yards' race IQ	100 yards' race IQ
12 & under	—255	.144	—062
13	.007	—101	—156
14	.550	—011	—129
15 & over	.002	—290	—018

Summarizing the results of the correlation tests we can say that intelligence quotients and athletic abilities are entirely unrelated. It is reasonable to assume, on the basis of our findings, that the lack of correlation between the tested factors is significant.

E. THE RELATIONSHIP BETWEEN BASIC INTELLIGENCE AND MECHANICAL APTITUDE

We were interested to know whether the results of the above study warranted conclusions as to mechanical aptitude. In order to obtain objective measurements with regard to this problem we determined general intelligence and mechanical aptitude from a sampling of pupils drawn from (a) technical colleges, (b) commercial classes of secondary schools, (c) non-commercial and non-manual classes of secondary schools.

It was also assumed that in this way a comparison could be made of the basic abilities of pupils following a general course, with those of others who take part in vocational training.

1. *Experimental Material*

The tests were conducted with 337 children from the following schools: Cape Technical College (C), Benoni High School (B), Selborne Junior High School, Johannesburg (S), Bookkeeping Class, Johannesburg (Bk), Observatory Boys' High School, Johannesburg (O), Yeoville Intermediate School, Johannesburg (Y), Witwatersrand Technical College (W), Manual Training School, Johannesburg (M-T)

2. Tests Used

The following tests were used: the South African Group Intelligence Test; the Stenquist Mechanical Aptitude Test, which has percentile age norms in one year increments from age 11 years 6 months, to 15 years 6 months

3. Statistical Treatment of Material

In this investigation the working of correlations was done by the Pearson product-moment method. The formula is as follows:

If x denotes the deviation of the first variable from the central tendency of its series, y the deviation of the second deviation from the central tendency of its series, N the number of scores, σ_1 and σ_2 the standard deviation of the first and second variables respectively, and r the coefficient of correlation then

$$r = \frac{\sum xy}{N \sigma_1 \sigma_2} \quad \text{but } \sigma_1 = \sqrt{\frac{\sum x^2}{N}} \quad \text{and } \sigma_2 = \sqrt{\frac{\sum y^2}{N}}$$

$$\text{therefore } r = \frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}}$$

It was in this form that the formula was used.

In reading the tables the important points to remember are that if two schools show a large difference in range (R) the one with the smaller range is relatively homogeneous, if there is a difference in standard deviation (SD) the larger deviation denotes a relatively heterogeneous character among the scholars tested for the particular ability under consideration. The coefficient of variation (CV), being a combined measure of both deviation and central tendency, is the most reliable measure for comparing two schools with respect to a given ability and is one in which even a small variation in quantity denotes a relatively large variation in performance.

4. Results

The results of the group intelligence test are indicated in Tables 2 and 3

The validity of the test as determined by the agreement of its results with those obtained from the teachers' estimates of the pupils'

TABLE 2

School	Mean	Boys				Mean	Girls			
		<i>AD</i>	<i>SD</i>	<i>R</i>	<i>CV</i>		<i>AD</i>	<i>SD</i>	<i>R</i>	<i>CV</i>
<i>C</i>	87.67	10.15	14.40	.76	16.42	—	—	—	—	—
<i>O</i>	81.30	10.72	13.07	.63	10.60	—	—	—	—	—
<i>B</i>	82.50	11.43	13.89	.52	16.22	88.45	10.05	11.30	.48	12.77
<i>Y</i>	87.38	8.76	10.85	.46	13.41	88.17	8.13	8.30	.27	10.55
<i>S</i>	90.10	8.69	10.70	.43	11.88	84.57	9.24	11.67	.51	13.80
<i>W</i>	88.13	11.49	13.45	.51	15.26	84.75	8.75	10.54	.39	12.44

TABLE 3

	Mean	Boys				Mean	Girls			
		<i>AD</i>	<i>SD</i>	<i>R</i>	<i>CV</i>		<i>AD</i>	<i>SD</i>	<i>R</i>	<i>CV</i>
Tech	87.85	10.50	14.08	.77	16.03	84.75	8.75	10.54	.39	12.44
M-T.	84.30	10.07	12.88	.65	15.28	86.58	8.75	10.57	.49	12.20

TABLE 4

CORRELATION OF SOUTH AFRICAN GROUP INTELLIGENCE TEST WITH TEACHERS
ESTIMATES OF PUPILS' INTELLIGENCE

School	<i>C</i>	<i>O</i>	<i>B</i>	<i>Y</i>	<i>S</i>	<i>W</i>
Correlation	.69	.53	.62	.51	.58	.68
Probable error	.074	.063	.122	.134	.078	.098

intelligence is shown by Table 4. The degree of correlation is substantial.

Incidentally, the results of this first test indicate that there is little difference in the intellectual quality of the material with which the Day Department of the technical colleges, the ordinary high schools, and the intermediate and junior high schools have to deal. It is, however, important to emphasize the large range that spans the upper and lower limits of the students. The scatter is immediately noticeable. Here we find students with intelligence quotients ranging from 133 to 76 in Technical Colleges, while in one High School we find a range from 142 to 83. It would appear that a boy whose intelligence quotient is as low as 83 could scarcely profit by the education provided by an ordinary high school. When in addition, we find that he ranks in the 30th percentile of a clerical ability test—details of which have been omitted in this communication—and further has the intention of seeking employment as a bank clerk,

it is not too much to say that for him educational and vocational guidance is a necessity. When we find that over seven per cent of a typical sample of our secondary school children are subnormal in intelligence it is evidence that at least seven per cent of our secondary school teaching is not put to the best advantage, for a secondary school, instead of including in its numbers children who are subnormal, should be composed of a select group of pupils.

F. MECHANICAL APTITUDE

The modified Stenquist *Mechanical Aptitude Test* was given to both boys and girls. This test consists of 95 pictorial items covering common mechanical objects. The series is divided into two parts, I and II. Each object in Part I has a corresponding object in Part II which "belongs with, is used with, or is part of" this second object. The student is asked to indicate which objects are connected with one another. The objects were in a large number of cases outside of the experience of the ordinary child unless he was particularly interested in the trade in which such appliances were used. Tables 5 and 6 represent the results of the test.

TABLE 5

School	Mean	Boys					Mean	Girls				
		AD	SD	R	CV			AD	SD	R	CV	
C	59.01	8.85	11.30	49	19.16	—	—	—	—	—	—	—
O	46.63	13.95	17.20	74	36.89	—	—	—	—	—	—	—
B	52.50	7.08	10.10	39	19.25	37.52	5.65	8.47	41	22.58		
Y	50.35	9.32	12.49	77	23.56	37.12	6.68	9.70	41	26.13		
S	55.09	8.21	9.66	40	17.52	34.05	8.00	9.84	34	28.88		
W	57.83	7.69	10.09	43	19.13	36.75	6.90	8.70	35	23.68		
*D	43.07	10.10	12.70	59	29.49	—	—	—	—	—	—	—

*Non manual training.

TABLE 6

	Mean	AD	SD	R	CV
Technical College Boys	59.01	8.85	11.30	49	19.16
Manual Training Boys	52.73	9.69	13.00	74	24.66
Non Manual Training Boys	43.07	10.10	12.70	59	29.49

The test may be said to measure general mechanical aptitude. This aptitude is not primarily a function of the student's definite mechanical training but, it is believed, is distributed among children

TABLE 7

School	C	O	B	Y	S	W
Correlation	38	42	44	38	36	32
Probable error	.11	.098	.120	.082	.094	.092

much as is general intelligence. The table of correlations (Table 7) between the Mechanical Aptitude Test and the standard intelligence test leads one to conclude that this aptitude is largely independent of general intelligence and that different functions are being measured.

These results indicate that no significant correlation exists between general intelligence and mechanical aptitude. It is certainly a remarkable result that the distribution of the relative capacities of the students in the different institutions from which our sample was drawn was practically alike. There was definitely no selection of pupils on the grounds of general intelligence, and the conclusion is warranted that youths in this country select their vocations without any regard to their capabilities. An entire lack of vocational guidance appears.

Conclusions

- 1 It appears that there is no significant correlation between general intelligence and mechanical aptitude and that different functions are being measured.
2. There appears to be a significant correlation between clerical ability and general intelligence.
3. The capacity of the students in the different institutions from which our sample was drawn appears to be alike; there is no selection of pupils on the grounds of general intelligence.
- 4 An important conclusion, the implications of which fall outside the scope of this paper, is that youths appear to have selected vocations without any regard to their capabilities. An entire lack of vocational guidance is revealed.

G. DISCUSSION

The statistical analysis of our results strongly suggests that basic intelligence and physical efficiency constitute entirely unconnected spheres of human ability. Thus, the old Latin proverb, "*mens sana*

in corpore sano" must be looked upon as an educational ideal, and not as a statement of a basic physiological fact

We have already stressed that our tests were chosen in such a way as to reveal the *inherent* mental as well as physical ability standards, rather than the more complex results of teaching and education. The problem of the *educability* of mind and body and the important question of the active and manifold inter-relation between the latter spheres have been dealt with in another communication (Jokl, Cluver, Goedvolk, and de Jongh, 1941).

The definition of biologically distinct spheres, mental as well as physical, in the total make-up of the human personality appears to us a highly important task. Too much has been assumed with regard to the existence of physiological "systems" and on inter-relations between such systems, as well as between physical and mental faculties, but too little has been proved. Thus Gesell and collaborators have recently produced important evidence which (in contrast to what has hitherto been assumed on insufficient evidence) suggests that sex represents a physiologically independent province which does not directly interfere even with such elementary functions as intelligence, character, and general body growth

Similarly, our present communication indicates that intelligence and physical efficiency constitute biologically independent complexes of individual development. Previously, we were able to demonstrate (Jokl and Cluver, 1941) that the three physiological components of "physical efficiency," skill, endurance, and strength, were largely independent of each other. This observation is significant, since each of these components represents certain functional performance standards of the motor sphere of the central nervous system, of blood circulation and respiration, and of the muscular system respectively.

Before we can develop a physiology of organic integration the nature and extent of the integrated factors must be known. In this connection the recognition of the principle of independence of mental and physical abilities appears to us to be of importance.

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THE SPONTANEOUS DRAWINGS OF ADOLESCENTS*

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An analysis of the drawings of young children reveals many interesting facts about them. Unfortunately, few attempts have been made to carry the studies into the adolescent years to discover what adolescents like to draw spontaneously, and how their drawings differ from those of young children. The study to be reported in the following pages was carried out for the purpose of throwing light on these problems. It was also hoped that an analysis of adolescent drawings would reveal information about adolescent interests and attitudes,

A. HISTORICAL SURVEY

Many experimental investigations of children's drawings have been made but, because the present study deals only with spontaneous drawings, or drawings made without any thought of using them for classroom or other purposes, only those investigations that relate to drawings made spontaneously by children will be summarized. Most of the studies were made a number of years ago. The recent trend in studying the child's drawings has been to request him to draw a specific object, such as a man, flower, boat or house, and then observe the number and correctness of details included in his drawings. Because these studies have no relationship to the one to be reported in this paper, no reference to them will be made.

Barnes (3) analyzed the drawings of 6,393 children, ranging in age from 6 to 16 years. The drawings were the children's free, spontaneous illustrations of the poem *Johnny Looks in the Ah*. Barnes made the following deductions from the data obtained: children like to draw large, distinct figures, using few lines; they are interested in heads up to nine years, drawing full faces at first, then profiles; typically the child's drawing is full of movement; and, finally, there is little difference between the drawings of boys and girls. Herrick

*Received in the Editorial Office on January 20, 1942

(7), in a study modelled along the lines of Barnes', analyzed the drawings of 451 children. He, too, found no sex difference except that the boys expressed themselves a trifle more fully than the girls. Profiles occurred in only 9.5 per cent of the drawings of children at the 5-6 year level as contrasted with 55.5 per cent at the 10, and 68.7 per cent at the 14-year level.

Maitland (12) collected drawings that represented the voluntary efforts of children 5 to 15 years of age. The drawings came from three sources: 700 from public school children, who had been given paper and pencil and asked to draw anything they pleased; 350 from 18 children of the Stanford Experimental School, who made the drawings out of school as presents for the teacher; and 350 done by seven or eight children during two years of school work during which they were permitted to draw what they chose for one-half hour weekly.

Maitland found that the younger children drew more freely and willingly than the older. To the child, drawing is a means of description, a form of language, Maitland contended. They make pictures of their material environment, and of persons and events that interest them. In addition, they describe their surroundings in extended landscapes. From the ages of 5 to 10 years, the children showed a preference for drawing men and women, but there was a marked and steady decline in this interest in the older group, with the lowest frequency at the 14-15-year level. Geometric designs, on the other hand, rose steadily in popularity until they reached first place at the ages of 14 to 15 years. Houses, plants, and animals decreased in popularity with age, while still-life ranked high in favor at all ages.

Similar investigations were made by Gallagher (5) and Lukens (11). Gallagher analyzed the drawings of 50 boys and 50 girls at each age level from 5 to 15 years, and noted less spontaneity with increasing age. This was shown by a decrease in number of different drawings made by each child, and an increase in the type of drawing taught in school. Lukens's analysis of 1,232 drawings of children under 10 years of age showed trends similar to those displayed in Maitland's study, especially a preference for the human figure and little interest in geometric figures, ornaments, and scribble.

McCarty (13), in a study of the drawings of 31,239 public school children, four to eight years old, from kindergarten and primary grades, reported that the younger children showed a preference for human and animal forms. The younger children drew the head in front view with eyes, nose, and mouth, and with legs and arms attached. The relative sizes of the body were commonly distorted. The older children in the group drew profiles more frequently than full faces, often drawing both eyes. Houses, trees, flowers, sun, moon, stars, and simple scenes gained in popularity as the children grew older while interest in the human form, fruits, vegetables, and insects decreased. No real difference between the sexes was apparent.

Ballard (2), in a study of London school children noted that before nine, full face views predominated and after nine, profiles. In the drawings of clothing, the children under nine made garments that were symbolic or decorative; after nine, attention was paid to details and current fashion. A clear-cut sex difference was apparent in these drawings. In the case of girls, between 9 and 15 years, 40 per cent of the drawings represented plants while for boys, ships were the favorite subject between the ages of 5 and 12 years. Hetzer (8) reported that the 3-year-old does not usually predict what he draws, the 4-year-old changes the designation to fit the product; and the 5-year-old names his drawing in advance of producing it.

Bender (4) analyzed the spontaneous chalk drawings of children on the sidewalks and open pavements of parks and on the East Side of New York City. Numbering things, such as blocks of pavement, and simple designs, as oblongs, proved to be very popular. Drawings of people were especially frequent, though these drawings were often incomplete in detail. Knauber (10) studied the spontaneous drawings of children, two to eight years of age, in schools where no formal art instruction was given. She found that in the nursery school group, anything new or interesting, without regard for pattern, interested them most while the older children showed a preference for their natural surroundings, people, trees, houses, or flowers, and for those subjects which they had learned by imitation. Because the older child's drawings are influenced to a large extent by his environment and recent happenings, this results in marked individual differences in what different children draw.

Gesell (6) found a genetic sequence in the spontaneous drawings of young children. At the age of four, the child's drawing has form and meaning. At five, the drawing is clearly recognizable for what the child names it to be and, in addition, parts are discriminated, as windows, chimney, and steps in a house. One-fifth of the children at this age, Gesell found, print letters, a quarter draw a person, a quarter a building, and the rest a boat, apple, Christmas tree, etc. At the age of six years, much the same subjects are drawn as at five, but there are twice as many details. No clear-cut differences appeared until the age of five. At that time, girls usually draw a house, lady, pumpkin, doll, cat, or girl, while boys prefer to draw a boat, flag, lighthouse, merry-go-round, bird's nest, or elephant. It is unusual, Gesell noted, for children to draw anything bizarre or eccentric.

B. PROCEDURE

Because it was decided that if the drawings of adolescents were to be spontaneous in the strict sense of the word, no procedure could be used that would lead the adolescents to believe that their drawings were to be studied and analyzed by others, especially for the purpose of scientific research. After careful consideration, it was finally decided to use a technique which might be criticized because of its lack of control over the conditions under which the drawings were made and lack of detailed information about the makers of the drawings; but which would give an opportunity to study drawings which, because of the conditions under which they were made could be classed in no other category than that of "spontaneous."

With this purpose in mind, the writer elicited the aid of a number of high school teachers and college students majoring in psychology. They were asked to collect, from whatever sources possible, drawings made by adolescents in classroom recitations, study periods, or times when they drew merely to amuse themselves. To obtain such drawings, the teachers and students went through scrapbaskets, they picked up crumpled papers in classrooms and halls, they asked to have note books handed in, without giving previous warning, they gave all students in the high school groups new book covers and asked that the old ones be returned. At no time, according to their reports, did the students suspect what was being done. In all, 1,451 separate drawings were obtained.

C. SUBJECTS

No detailed or specific information can be given about the adolescents whose drawings were analyzed. They came from the junior and senior classes of high schools in New York City and suburban communities surrounding New York, and from Barnard College, Columbia College, and University classes at Columbia University. The age range was roughly from 15 to 23 years, with the major part of the group falling into the 17-20 year subdivision. Because of the method used, it was impossible to determine the exact age of the individual who drew the pictures. Consequently, no comparisons could be made of the drawings of younger adolescents with those of older adolescents.

As some of the classes were co-educational, it was impossible to tell, from the method used in collecting the drawings, which were made by boys and which by girls. When the drawings came from boys' or girls' groups, they were labelled, as in the case of the book covers and note books from high school students. Only those definitely known to be the work of one sex or the other were considered in the section relating to "Sex Differences."

D. RESULTS

The 1,451 drawings were first analyzed, to determine what was the topic of each. They were then classified into groups, made up of a number of related topics as, for example, "Human Forms," which included all drawings of men and women. In Table 1 are summarized the major classifications of the drawings:

A brief explanation of some of the terms used in Table 1 will serve to clarify their meaning. "Printed words" included all words or phrases in which the adolescent attempted to print instead of writing the letters. In many instances, the printing was elaborately done, with shading or other forms of decoration. "Conventional designs" relates to geometric figures and stereotyped patterns. This contrasts with "Ornamental designs" in which elaborate borders and decorations appeared. The classification of "scribbling" includes all drawings which had no distinctive pattern and which appeared to have been made without thought or plan on the part of the artist. "Backgrounds" related to pictures in which a background appeared even though the picture received major emphasis. This was distin-

TABLE 1
TOPICS OF ADOLESCENT DRAWINGS

Topic	Number	Per cent of total
Printed Words *	396	27.3
Caricatures	331	22.8
Human Forms	250	17.2
Conventional Designs	113	7.7
Sports	80	5.5
Animals	52	3.6
Houses	49	3.4
Scribbling	37	2.5
Numbers	37	2.5
Boats	27	1.8
Airplanes	16	1.1
Flowers	13	.9
Ornamental Designs	13	.9
Backgrounds	13	.9
Landscapes	12	.8
Furniture	2	.1*
Machinery	2	.1*
Eye glasses	1	.07*
Coat	1	.07*
Pocketbook	1	.07*
Hands	1	.07*
Fingerprint	1	.07*
Train	1	.07*
Banjo	1	.07*
Boys singing	1	.07*
Total	1,451	99.66

*Approximate.

guished from "landscapes," in which the picture was a unit, not as a background for a specific figure.

A careful analysis of Table 1 will reveal some interesting data about the drawing interests of adolescents. The most common form, words printed in a decorative fashion, appeared in 27.3 per cent of the drawings. Caricatures came next, in 22.8 per cent of the drawings, while human forms appeared in only 17.2 per cent. Conventional designs, sports, animals, and houses proved to be less popular. Drawing of numbers occurred in only 2.5 per cent of the cases, which is in marked contrast to the popularity enjoyed by printed words. Interest in drawing backgrounds for figures or landscapes was slight, as shown by the fact that the former appeared in only .9 per cent of the drawings, and the latter in .8 per cent.

Comparison of the results obtained in this study with those pre-

viously reported, reveals some marked differences between the drawings of children and those of adolescents. Printed words, which ranked in first place among adolescent drawings, are rarely found in children's drawings. Gesell (6) reported that at the age of five years, one-fifth of the children studied by him printed letters. He also noted that it is unusual for young children to draw anything bizarre or eccentric. This contrasts markedly with adolescents, for whom caricatures stand in second place in popularity.

Human forms are reported by many investigators to be found frequently in children's drawings. Maitland (12) noted a preference for drawings of this type at the ages of 5 to 10 years, but a decline with age to a point where they stood lowest in popularity at the 14- to 15-year level. McCarty (13) noted a similar tendency for decline in interest to occur from the ages of four to eight years. Children under 10 years of age, Lukens (11) found, show a preference for drawing the human form. One-fourth of the drawings of 5-year-olds studied by Gesell (6) were of persons. Bender (4) found human forms appeared frequently in the sidewalk drawings of children, but they were often incomplete. In the drawings of adolescents, the human form ranked third in popularity.

Conventional design, which includes geometric figures, ranked fourth in order of popularity in adolescent drawings, even though it occurred in only 7.7 per cent of the total number. Maitland (12) reported that it stood in first place in popularity of the drawings of the 14-15-year-olds, Bender (4) noted frequent use of it in the sidewalk drawings of children, while Lukens (11) reported that children under 10 years of age showed little interest in it. The only reference to scribbling by children was made by Lukens (11) who referred to the fact that children under 10 showed little interest in it. In the adolescent drawings, scribbling likewise occurred relatively infrequently, in only 2.5 per cent of the cases. Drawing of landscapes was not frequent among adolescents (.8%). This contrasted with its popularity among children two to eight years old, as reported by Knauber (10). Maitland (12) found that young children, from 5 to 10 years, liked to describe their surroundings in landscape drawings.

Houses (3.4%), flowers (.9%) and animals (3.6%) occur in only small percentages of the adolescent drawings. This is in ac-

cordance with the findings of Maitland (12) who noted a decrease in popularity of these drawing topics as children grew older. Knauber (10) reported them to be found frequently among the children from two to eight years, McCarty (13) from 4-8 years, while Gesell (6) estimated that one-fourth of the drawings of the 5-year-olds studied by him were of houses, and a number of the others were of trees, boats, etc. McCarty (13) found the drawing of animals to be popular with children, four to eight years old. By contrast, only 3.6 per cent of the adolescent drawings were of animals.

Because so many of the reports of children's drawings state specifically what the drawings of the human form included, it was decided to analyze the drawings of this type that were made by the adolescents. In Table 2 are presented the results of the analysis.

TABLE 2
DRAWINGS OF THE HUMAN FORM

Topic	Number	Per cent of total
<i>Man</i>	124	49.6
Profile	106	85.5
Full face	18	14.5
Head only	111	89.5
Full body	13	10.5
<i>Woman</i>	111	44.4
Profile	99	89.2
Full face	12	10.8
Head only	105	94.6
Full body	6	5.4
<i>Man and Woman</i>	15	6.0
Profile	14	93.3
Full face	1	6.7
Head only	15	100.0
Full body	0	0.0
Total	250	100.0

The drawings of the human form were divided into three groups, men, women, and men and women. No attempt was made to distinguish between "man" and "boy" or "woman" and "girl," since all of the drawings represented mature individuals. There was not a single drawing of a young child, or of a baby in the total of 250. Of this number, nearly one-half, or 49.6 per cent were drawings of men, 44.4 per cent were of women, and 6.0 per cent were draw-

ings of a man and a woman, generally in some romantic relationship, such as kissing one another.

The drawings were further analyzed to see what percentages were profile and what full face; how many of them were of the head alone, and how many of the entire body. In the drawings of men, 85.5 per cent were found to be profiles as compared with 14.5 per cent of full faces, 89.5 per cent were of the head alone, and only 10.5 per cent were of the full body. Similar distributions were found in the drawings of women. Only 10.8 per cent were full face drawings as contrasted with 89.2 per cent of profiles; 94.6 per cent were of the head alone, and only 5.4 per cent of the full body. Of the 15 drawings of a man and a woman, only one had full faces, and all were of the head alone.

A comparison of drawings of the human form by adolescents and by children brings out some interesting facts. At no time is there any reference to the child's preference for drawing male rather than female forms. In the drawings of adolescents, there was likewise no preference for one as contrasted with the other. Young children show a preference for drawing full faces, as reported by Barnes (3), Herick (7), McCarty (13), and Ballard (2) while older children generally draw profiles. The change becomes apparent around the ages of 8 to 10 years. Young children usually draw the whole body, even if the relative sizes of the parts of the body are distorted, McCarty (13) noted, while few adolescents are interested in drawing more than the head. When the adolescent does draw the full body, the proportions are correct, and the details of the clothing are given. This contrasts with the child's drawings, in which few details of clothing are given and these, Ballard (2) noted, are symbolic or decorative. After the age of nine, attention is paid to details and to correct fashion. In none of the studies of children's drawings is there reference to drawings of children or babies. Not one of the 1,451 drawings of adolescents was of a child or a baby.

The tendency to ridicule others in drawings seems to be limited to adolescence. In not one of the studies of spontaneous drawings of children is there a reference to caricatures, and Gesell (6) stresses the fact that it is unusual for children to draw anything bizarre or eccentric. An analysis of adolescent drawings tells another story.

Of the 1,451 drawings examined, 331 or 22.8 per cent were caricatures, as contrasted with 250 or 17.2 per cent of the total number that were faithful reproductions of the human form. The caricature drawings were then subdivided into groups to discover what type or types of individual the adolescent most frequently caricatures. The results are presented in Table 3

TABLE 3
CARICATURES

Subject	Number	Per cent of total
Man	185	55.9
Woman	18	5.6
Characters from "Funnies"	60	18.1
Teacher	39	11.7
Contemporary Public Personages	21	6.3
Historical Characters	8	2.4
Total	331	100.0

A critical analysis of the data presented in Table 3 will reveal that over half, or 55.9 per cent of all of the caricatures were of men as contrasted with 5.6 per cent of women. Reproductions of "funny paper" cartoons, especially the outstanding personage of the cartoons, was second in line in popularity. The third most popular caricature was of "teacher," and this was found almost exclusively in the drawings of high school students. Only three of the 39 drawings labelled "teachers" were made by college students. The favored contemporary personages to be caricatured were Hitler, Roosevelt, LaGuardia, and Lindbergh, while among the caricatures of historical characters were Napoleon, Caesar, and King Arthur.

Why the adolescent prefers to caricature men rather than any other type of individual is open to conjecture. A study of the caricatures of men reveals that the reason may be that the adolescent derives more pleasure from laughing at abnormalities of physique than at eccentricities of dress. The caricatures of men were almost entirely based on peculiarities of physique, such as a too long nose, a too prominent "Adam's apple," a bald head, or a decidedly receding chin, while the caricatures of women emphasized badly kept hair and prominent teeth. As most of the caricatures of "teacher" were

of men teachers, the same physical traits were exaggerated as in the cases of caricatures of men, except that all but four of them were depicted with large eyeglasses of the tortoise shell type. The characters from the "Funnies" were faithful reproductions of comic strip personalities as found in New York City newspapers or in the syndicated sections of out-of-town papers.

To a young child, writing or printing is laborious. It is not surprising to discover, then, that in none of the studies of the spontaneous drawings of children has there been any reference to printing of letters or words. And, yet, this proved to be the most popular form of spontaneous drawings of the adolescent. As has already been pointed out, only instances in which the letters were shaded or decorated in one way or another were they classed as forms of "drawing." As analysis was then made to see what forms of printed words there were, and the frequency of their occurrence. The results are presented in Table 4.

TABLE 4
PRINTED WORDS

Words	Number	Per cent of total
Slogans and Phrases	105	26.6
Single Words	96	24.2
Slang Expressions	92	23.2
Personal Names	72	18.2
Initials	31	7.8
Total	396	100.0

An analysis of the figures presented above will show that the three first groups were almost equally distributed. Writing of slogans and phrases, such as "The Spirit of American Youth," "Free admission only with my permission," and "Often one who is all 'I's' can't see beyond his 'Knows'", single words, as "Chemistry," "Physics," "Plainfield," "Closed," and "Fizics", and slang expressions, as "Sez you," "Scram," "Oh yeah," and "Hell," occurred each in approximately 25 per cent of the drawings. Printing of initials proved to be the least popular, and occurred in only 7.8 per cent of the cases.

Detailed analysis of the other topics of the drawings is not justified because of the relatively small number found in each case. A brief

analysis, however, will be sufficient to show what the major interests of the adolescents were in these relatively infrequent forms of drawings. The most popular forms of conventional design proved to be stars and triangles. Occasionally a pattern, in the form of a border around the paper appeared, but most of the conventional designs were of single, geometric figures. Drawings of golf players in action predominated in the sports drawings. Fifty-one of the 80 were of this type, while 12 were of football players, 9 of tennis players, 5 of baseball players, 2 of ski jumpers and one of a jockey.

Zoo animals, such as lions, tigers, and elephants, proved to be the most popular topic of the drawings of animals. Of the 52, 23 were of this type as contrasted with 12 dogs, 6 horses, 5 birds, 3 fish, one cat, one hen, and one mouse. Sailboats were the most frequently drawn type of boats, with speedboats second in rank of frequency. There were 16 of the former, 7 of the latter, 2 of ocean liners and one each of rowboats and canoes. While there were 13 flowers, it was impossible to label any one of them as representative of a specific species. They seemed, for the most part, to be conventional forms of daisies, with an occasional attempt to draw a rose or iris. When backgrounds were given, they were generally in the form of shading, to bring out into relief the picture. Both of the drawings of furniture were chairs.

As was pointed out in the section of this paper that deals with method of study, it was impossible to determine in many cases whether the drawings were made by boys or girls. It was only when the drawings came from school or college groups that were not co-educational that there was definite evidence of the sex of the artist. Consequently, only these drawings were analyzed to determine what, if any, sex differences exist. The results are presented in Table 5.

Of the 1,451 adolescent drawings analyzed in this study only 462, or slightly less than one-third of the total number, could be identified as being the work of a male or of a female artist. Two hundred and ninety-one of the drawings were made by boys and 171 by girls. This does not mean that boys draw more frequently than girls. It merely means that in this particular study, it was possible to identify more drawings made by adolescent boys than by adolescent girls. Any conclusions drawn in regard to sex differences must,

TABLE 5
SEX DIFFERENCES

Topic	Male		Female	
	Number	Per cent of total	Number	Per cent of total
Printed Words	87	29.9	33	19.3
Cartoonures	96	32.9	4	2.3
Human Forms	53	18.2	61	35.7
Conventional Design	4	1.3*	39	22.8
Sports	22	7.5	2	1.1*
Animals	6	2.0	11	6.4
Houses	0	0.0	3	1.7
Scribbling	1	0.3*	4	2.3
Numbers	5	1.7	3	1.7
Boats	9	3.1	0	0.0
Airplanes	7	2.4	0	0.0
Flowers	0	0.0	4	2.3
Ornamental Designs	0	0.0	3	1.7
Backgrounds	0	0.0	2	1.1*
Landscapes	0	0.0	1	0.6*
Furniture	0	0.0	0	0.0
Machinery	0	0.0	0	0.0
Eyeglasses	0	0.0	0	0.0
Coat	0	0.0	0	0.0
Pocketbook	0	0.0	0	0.0
Hands	0	0.0	1	0.6*
Fingerprint	0	0.0	0	0.0
Tram	0	0.0	0	0.0
Banjo	0	0.0	0	0.0
Boys Singing	1	0.3*	0	0.0
Total	291	99.6	171	99.6

*Approximate

therefore, be tentative, and serve merely to indicate a trend. They cannot, at any time, be regarded as conclusive.

A study of Table 5 will reveal several sex differences that are worthy of consideration, the most important of which is the marked tendency on the part of boys to draw cartoonures, as compared with girls. Girls, on the other hand, draw the human form as it is more frequently seen than boys do. Interest in conventional design is decidedly more marked among girls than among boys, while the boys show a stronger preference for printed letters than do the girls. A larger percentage of boys drew sports pictures, and pictures of boats, while there were more drawings of animals, flowers, and houses by girls. These, however, were too small to be worthy of serious attention.

A more detailed analysis of the drawings of the two sexes revealed several further points of interest. Boys drew many more pictures of men than of women while girls favored their own sex in their drawings. Relatively few of the girls' drawings were of men. When boys printed words, it was more often slang expressions, "smart" phrases, and their own names than anything else. Girls generally wrote their names, initials, name of the course of study, or some matter-of-fact word. Girls, as a whole, ornamented their lettering more than boys did, while boys attempted to print letters with a precision and accuracy that suggested duplicating the work of a professional.

Studies of children's drawings have referred to the fact that no important sex differences exist. Barnes (3) and McCarty (13) report no sex difference, while Herrick (7) comments that boys expressed themselves a trifle more fully than girls. Ballard (2) noted that between 9 and 15 years the favored topic of drawing for girls was plants, and for boys, between 5 and 12 years, it was ships. Gesell (6) stated that no clear-cut sex differences appeared until the age of five, when girls showed a preference for drawing a house, lady, doll, etc., and boys for boats, flags, merry-go-rounds, and elephants.

The more marked sex differences that appear in adolescent drawings as compared with the drawings of children may reveal a difference in point of view and interest that is well worth considering. It would suggest that boys enjoy making fun of others more than girls do, and that they poke fun at their own sex more often than at the opposite sex. Girls, on the contrary, prefer to see the members of their own sex in as favorable a light as possible, and even though their drawings fall short in artistic achievement, there is apparent in them an attempt to draw a "pretty" picture. The other sex difference that suggests a difference in interests is that which occurs in the printed words. Boys display a marked tendency to "show-off," or to be "smart," while girls are matter-of-fact in their reactions.

E. SUMMARY AND CONCLUSIONS

A summary of the data presented in this paper reveals the following outstanding facts about the spontaneous drawings of adolescent boys and girls.

1 The favored forms of spontaneous drawing consist of decoratively printed words, caricatures, human forms, and conventional designs. This contrasts markedly with studies of children's drawings, in which printed words and caricatures rarely ever appear.

2 Drawings of men and women occurred with almost equal frequency. There were no drawings of little children or of babies. This is similar to the results found in the studies of children's drawings.

3 Profiles were favored to a marked degree as compared with fullface drawings. Very few drawings were of the entire form. Comparison with children's drawings showed that young children prefer to draw full faces and older children, profiles. Children generally draw the entire body, even though the relative proportions are incorrect.

4 Analysis of the caricatures showed that men were ridiculed in 55.9 per cent of the drawings as compared with 5.6 per cent in the case of women. The next two forms most frequently found were characters from the current "Funnies" and "Teacher."

5 Decoratively printed words, the most popular form of adolescent drawings, consisted mostly of phrases, single words, and slang expressions. Personal names and initials appeared less frequently. This is an almost exclusively adolescent form of drawing, because children find writing a laborious task.

6 A study of sex differences showed that boys draw many more caricatures than girls, and show a preference for printed letters. Girls, on the other hand, more frequently draw true-to-life pictures of people, animals, and flowers. No sex differences worthy of note are reported in the drawings of children.

The results obtained in this study lead to the general conclusion that the spontaneous drawings of adolescents reflect their interests which are, for the most part, different from those of children.

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YOUNG CHILDREN'S FAVORITE STORIES AND CHARACTERS, AND THEIR REASONS FOR LIKING THEM*

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An individual interview of 51 boys and 58 girls in the five-and-a-half-year-old kindergarten and Grades 1A to 2A of the Hunter College Elementary School was made to ascertain what stories and what characters the children liked best and why. The interview was informal and the children responded readily. The children came from socio-economically privileged homes and had mental abilities much above average in most cases.

The procedure was as follows. The children were asked to tell what stories they liked very much and their responses were noted. When each child had named all he wished to, the list was read over to him and then the question was asked, "*Now, which of all these stories do you like the most of all?*" In practically every case the answer was quickly given with perfect assurance. Then the child was asked why he liked that story best of all.

The next step was to say, "*In all these stories that you like there are a great many different people, a great many persons. Which of all the persons in all these stories do you like best of all?*" After the answer the child was asked to tell why he liked the person he had named as favorite.

Seventy-eight different favorite stories were named by the 109 children. This shows, of course, a great variety of interest. Only 19 were named two times or more. These 19 titles are given in Table 1 by grade and sex, and are arranged in order of frequency of mention. *Pinocchio*, at the top of the list, had recently appeared in the movies, which probably explains its popularity in large part. There was no clear evidence of differences in interests related to grade levels. *Pinocchio*, for example, was named in every grade. The scatter of all the other titles mentioned more than once seemed

*Received in the Editorial Office on January 27, 1942.

TABLE 1
MOST FREQUENTLY NAMED FAVORITE STORIES

	Boys	Girls	Total
1. <i>Pinocchio</i>	8	1	9
2. <i>Wizard of Oz</i>	2	4	6
3. <i>Little Red Riding Hood</i>	1	3	4
4. <i>Castle Under the Sea</i>	0	3	3
5. <i>Little Black Sambo</i>	2	1	3
6. <i>Pony, A</i>	1	2	3
7. <i>Snow White</i>	1	2	3
8. <i>Three Bears</i>	0	3	3
9. <i>Three Pigs</i>	2	1	3
10. <i>Wee Mouse</i>	1	2	3
11. <i>A. Lincoln</i>	2	0	2
12. <i>Alice in Wonderland</i>	1	1	2
13. <i>Bible Stories</i>	0	2	2
14. <i>Gulliver's Travels</i>	2	0	2
15. <i>Little Old Nickel</i>	1	1	2
16. <i>Sleeping Beauty</i>	0	2	2
17. <i>Three Little Kittens</i>	0	2	2
18. <i>Uncle Wiggley</i>	1	1	2
19. <i>Tom Sawyer</i>	0	2	2
Total	25	33	58

to be quite generally over the four grade levels, except the story of A. Lincoln, which was found in Grade 2*A* only. In the case of the 59 stories named only once each there did not seem to be any marked trend according to grades. Possibly the choices of the 2*A* children showed preferences for somewhat more mature material, e.g., *Air Show*, *Bobbsey Twins*, *Hans Brinker*, and *The Story of Washington*, but others of 2*A* choice were *Copy Kitten*, *Little Old Nickel*, *Star Dollars*, and *Wee Mouse*. At the other end the kindergarten children named Bible stories, *Gulliver's Travels*, *Peter Pan*, and *Tom Sawyer*. It is generally accepted that a range of as little as two years at this age of childhood does not materially modify children's reading interests. For example, bibliographies of young children's literature commonly indicate books for ages 5-7, 6-9, etc.¹

One chance factor of considerable importance did affect the choices of the children. That was the reading which recently had been done in school, both as class work by the children or the teachers, and as free time reading in the room library alcoves.

Sex differences were more marked. The evidence is limited, but

¹See A Bibliography of Books For Young Children, The Association for Childhood Education, Washington, D. C. 1941.

can be found in the 19 titles given more than once. Six boys and only one girl named *Pinocchio* as their favorite book, and two boys and no girls gave each of the following titles: *A. Lincoln*, *Gulliver's Travels*, and *The Monkey and the Hat*. No boys and three girls named *The Three Bears*, and no boys and two girls named each of the following: *Bible Stories* and *Sleeping Beauty*. This quite limited evidence agrees with other evidence somewhat more extended found in the analysis of the names of all the stories the children named, which has been reported elsewhere.²

Reasons for liking their favorite stories were tabulated by grade and sex, but space prohibits presenting this very interesting material. Great variation, odd associations, amusing bases for judgment, and the like, were shown. For example, stories were liked because they were funny, very scary (*Three Pigs*), full of mischief (*Tom Sawyer*), it's poems (*Mickey Mouse*), the witch (*Wizard of Oz*), gangsters and smugglers, it's true, has a wolf, dwarf became giant, made mud porridge, magic in it, hat part funny, can sing this, something of robbers, fit for a big boy, mother taught him to be nice, brave stories, so short, long story, cute, etc.

An attempt was made to classify these reasons, and Table 2 shows the result of this tabulation by sex for the total group. Twenty-three terms were used to classify the 113 reasons given by the children. Some children gave more than one reason and others did not give any. Ten of these terms classify reasons that were contributed by both sexes and interestingly enough in almost equal numbers. Five others were given by only one child each. The two most common reasons were adventure, indicated by 29, and funny, given by 28. For the latter classification most of the children used the word "funny," but many expressions, such as exciting, very scary, getting into trouble, has witch, pig throws apple, and the like were classified under adventure. No other groups of reasons were anywhere near as frequently suggested as these two.

There were too few data to warrant trying to determine different grade level trends. One possible tendency, however, appeared in connection with the frequency of adventure as a reason. The younger children seemed to have relied on expressions which were so classi-

²Wilson, F. T. Stories liked by young children. *J. Genet. Psychol.*

TABLE 2
REASONS FOR LIKING FAVORITE BOOKS, CLASSIFIED BY SEX

		Boys	Girls	Total
<i>Part (a) Reasons given by both boys and girls</i>				
Adventure		15	14	29
Funny		14	14	28
Interesting		3	4	7
True		3	2	5
Animal		2	3	5
Familiar		2	2	4
Prince, fairy		2	2	4
Personal qualities		1	2	3
Like so much		1	1	2
Sing, play it		1	1	2
Because of three sons		0	1	1
Appearance		0	1	1
Mother taught him to be nice		1	0	1
Magic		1	0	1
So short		1	0	1
Total	15	47	47	94
<i>Part (b) Reasons given by girls only, two or three times</i>				
Rhymes			3	3
Different			3	3
Like beach, woods			3	3
Illustrations			2	2
Patriotic			2	2
About people			2	2
Total	6		15	15
<i>Part (c) Reasons given by boys only, two or three times</i>				
Saw picture		2		2
Trains, airplanes		2		2
Total	2	4		4
Grand total	23	51	62	113

fied somewhat more frequently than did the older ones, who gave a greater variety of answers.

Sex differences seemed more pronounced. Parts *b* and *c* of Table 2 show that 15 girls and no boys gave answers which were classified under six different terms, while four boys and no girls contributed to two other classifications. The girls' reasons in part *b* indicated considerable discrimination, which did not seem to be true for the boys' answers.

The variety of favorite characters and reasons for liking them were as great as those for favorite books. Ninety-nine different characters were named once only, and five were mentioned by two

pupils each. No character was named more than twice. A classification of the characters was made as shown in Table 3. No sig-

TABLE 3
CLASSIFICATION OF FAVORITE CHARACTER

	Boys	Girls	Total
<i>Nature of favorite character</i>			
Animals	13	16	29
Boys	13	12	25
Men	12	7	19
Girls	2	15	17
Women	3	3	6
Fairies	2	3	5
Babies	3	1	4
Inanimate	2	0	2
Unknown	1	0	1
Total	8	51	57
<i>Nature of story in which characters appeared</i>			
Fairy	0	5	5
Fantasy	36	34	70
Real life	14	18	32
Unknown	1	0	1
Total	4	51	57

nificant grade trends appeared in the data, so only totals by sexes are given. Disagreements might appear in classifications made by others but it seems unlikely that the main points brought out in the table would be materially changed. Animals, boys, men, and girls, in that order, were the most commonly named types of favorite characters, the first two leading the last two by considerable amounts. The number of choices for the fifth type, women, was far below the leading four, as were the two following, fairies and babies. A possible sex preference is suggested by the fact that 15 girls but only two boys named a girl as a favorite character, while 12 boys and 7 girls indicated men. Proportionally the girls chose almost as many boys for favorites as they did girls, whereas the boys showed only slight interest in girls as favorite characters. The proportional preferences for men and women also showed marked sex differences, the interest in men being 12 to 7 that in women 3 to 3 by boys and girls, respectively. No other differences were indicated as to type of character. Both sexes evidenced quite similar degree of preference for animals.

In the classifications of the nature of the stories in which favorite characters were found, one or two points seem of interest. First, fantasy stories, e.g., *Little Black Sambo*, *Peter Rabbit*, and the like, were by far the most popular of all for both boys and girls. Real life stories, however, ranked well in popularity for both sexes. In view of the fact that the supply of real life stories for young children is probably very much less than that of fantasy tales, this high proportion is quite impressive. It was shown in all grade levels and by more of the girls than the boys in the kindergarten and grade 1A. The numbers were as given in Table 4. A final point in the last

TABLE 4

	Kdn	1A	1B	2A
Boys	1	2	7	4
Girls	3	6	4	5

part of Table 3 is that five girls but no boys named characters in fairy tales.

The reasons given for liking the favorite characters were classified under 11 headings, as shown in Table 5. Personal qualities—

TABLE 5
REASONS FOR LIKING FAVORITE CHARACTERS, BY CATEGORIES

	Boys	Girls	Total
Personal qualities	9	23	32
Funny	14	9	23
Adventurous (did exciting things, gets into trouble)	9	9	18
Appearance (nicely dressed, pretty with curly hair)	4	3	7
Animals (like to watch deer)	4	2	6
Magic	2	2	4
Accomplishment (have babies and water)	3	1	4
Plays (made mud pies)	0	3	3
Body condition (hungry girl, sleepy girl)	0	2	2
True, real	2	0	2
Miscellaneous	3	3	6
Total	50	57	107

nice girls, good, cute, smart, tells Buddy truth, acted best, mean, careless—lead with 32. Being funny was next and adventurous third, with 23 and 18, respectively. The other headings had many fewer numbers. Sex differences were suggested by 23 girls and only

9 boys mentioning personal qualities, but little other evidence in that respect was found.

Comparison of the reasons given by the children for their favorite stories and for their favorite characters shows two differences of interest, which may be noted by comparing Tables 2 and 5. The most striking difference was as to personal qualities, which was given only three times for stories, but 32 times for characters. This marked shift bears out to a degree the belief by teachers and examiners that the children were giving reliable answers to the questions. The large increase in this classification of reasons for liking characters seemed to have been made at the expense of adventurousness, which had 18 given characters and 29 for stories.

SUMMARY AND CONCLUSIONS

1. One hundred and nine boys and girls from privileged homes were interviewed regarding their favorite stories and characters and reasons therefor.

2. There was a great variety of favorite stories, 78 being named and only 19 of these being named more than once. These 19 included old children's favorites, such as *The Three Bears* and *Little Red Riding Hood*; some of the better modern children's stories, such as *Little Black Sambo* and *Alice in Wonderland*; Bible stories; and some of the more mature informational type of material, such as *A. Lincoln* and *Gulliver's Travels*.

3. Very little evidence of marked grade level differences was found, but boys tended, perhaps, to prefer the mature and informational material, while the girls seemed more content with the more traditional, such as *The Three Bears* and *Sleeping Beauty*.

4. A considerable variety of reasons for liking their favorite stories was shown, although adventure and humor were by far the most general for both sexes. Girls expressed somewhat greater discrimination in other respects than did boys.

5. A similar variety in favorite characters and reasons for liking them was also revealed. Animals and boys were most frequently mentioned, about equally by the two sexes. Girl characters were many more times appealing to girls as to boys, while men characters were nearly twice as often named by boys as by girls. Women, fairies, and babies were decidedly not the most popular.

6. Sixty-five per cent of the favorite characters were found in fantasy stories, 30 per cent in real life stories, and only 5 per cent in fairy tales.

7. Comparison of reasons for liking stories and characters showed that stories were most frequently favored because they were funny and characters because of personal qualities. Many other types of reason, however, were given for the favorite stories and characters.

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THE EFFECT OF VARYING THE PLACE OF THE FRACTIONAL ANTICIPATORY-CONSUMMATORY RESPONSE UPON THE RATE OF ACQUIRING A SIMPLE LEARNING PROBLEM*¹

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The fractional anticipatory goal response is of considerable interest in present day theorizing concerning the learning process. Those individuals such as Hull (9) and Guthrie (6) who approach the problem of learning from the viewpoint of association or the conditioned response have consistently emphasized the rôle of the anticipatory goal response as a behavior substratum which it is possible to condition in problem-solving behavior. It is also true that Tolman (13, 14), as a representative of field-theory, uses much the same mechanism, i.e., impulses aroused by a "drive" which determine the course of behavior toward a goal, although he describes the resultant intervening variable as the formation of a "sign-Gestalt-expectation" or "readiness" rather than as " r_p 's." I had hoped when this experiment was formulated that it might help determine which set of terminology better fitted the observed facts, but as far as I can determine, these results can be interpreted either in terms of the conditioned response theory or in terms of field theory. But as Hilgard and Marquis (7) have emphasized in *Conditioning and Learning*, more experimental confirmations are needed concerning the rôle of the fractional anticipatory goal responses during the course of learning.

It has been previously demonstrated (3, 4, 5, 8, 11) that a small amount of the reward given immediately before the act to be learned accelerates the learning process. This is indirect evidence for the anticipatory goal responses as the integrators of activity directed

*Received in the Editorial Office on January 27, 1942.

¹This study was presented at the Northwestern meeting of the American Psychological Association in 1941. The progress of this experiment has been aided by Dean P. T. Miller and Dr. J. R. MacNeel in being classified at N.Y.A. project V1-26. Carwin Linford and Lloyd Linford have been careful workers.

toward the goal. It seemed possible to demonstrate more clearly the rôle of these responses by varying the *place* where the preliminary reward was given.

In order to demonstrate the rôle of these preliminary goal responses, 42 naïve white rats from the colony at the University of Wyoming were allowed to drink their fill of tap water once a day for 10 days from a modified eudiometer in one corner of a small field. This was the only water the animals received during the experimental routine. From Figure 1 can be observed the plan of the

18	19	F
15	16	17
12	13	14
9	10	11
6	7	8
3	4	5
1	S	2

PLAN OF FIELD

FIGURE 1

field. The animals had their preliminary drink in square "F." The animals were not allowed to wander from the square in which the eudiometer was placed. When they attempted consistently to leave the square in which was the water, it was regarded as a criterion

that the drive was becoming satiated, and they were placed back into their living cages.

After this preliminary training the animals were divided into three groups. One animal died during the preliminary training so that there were 14 animals in two groups, and 13 in one. Group 1 was started from the usual starting place at one end of the field, Square "S," and received no preliminary water. Group 2 was picked up before the run and given approximately one-half a c.c. of water by hand, then placed in the starting square at the end of the field. Group 3 was placed at the finish, Square "F," the place at which the animals had been trained to drink, and the animals were allowed one drink at the goal and then were placed in the starting square of the field. The field was marked into foot squares and was surrounded by black cloth. The amount of excess distance was recorded which was the number of squares into which the animals placed at least two feet besides the seven into which they had to go in order to attain the square in which was the water. The time was recorded by a stop watch from the time the animals were placed into the field in the starting square until they began to drink at the finish. Other measures obtained were the amount of water consumed by each animal, and the time of the first drink. The amount of water given the two groups of animals before the run was about one-half a c.c. This measure was particularly inexact for those animals who drank at the finish, for by the time the eudiometer measured one-half a c.c., sometimes the animals had consumed a little more. The animals were run singly and were given one trial a day.

One way of experimentally ascertaining the significance of the fractional anticipatory goal responses might be to eliminate the "anticipation" and give fractional goal responses before the run and see if these fractional goal responses would affect the learning process.

The theory underlying the experiment then would be as follows: if the fractional anticipatory goal responses are of significance in learning, then those animals who receive the preliminary drink at the goal where they are accustomed to drink should have a greater reinforcement than those animals who receive the preliminary drink administered at the hands of the experimenter outside the field. These animals, in turn, should show superior performance to those

animals who receive no preliminary reinforcement previous to the run on the field.

The results of the experiment can be seen in Table 1. An inspection

TABLE 1

THE EXCESS DISTANCE AND THE TIME TO WATER OF GROUP 1 (WATER AT FINISH ONLY); GROUP 2 (ONE-HALF C.C. OF WATER GIVEN BEFORE RUN WITH EYE-DROPPER BY HAND); GROUP 3 (ONE-HALF C.C. OF WATER DRUNK BY ANIMAL AT FINISH BEFORE DAILY TRIAL)

Days	Excess distance			Time in seconds		
	Group 1 <i>n</i> —13	Group 2 <i>n</i> —14	Group 3 <i>n</i> —14	Group 1	Group 2	Group 3
1	9.00	15.50	6.86	96.80	83.21	57.57
2	6.92	4.79	1.71	47.67	18.61	18.71
3	4.07	2.50	1.50	26.15	11.84	17.43
4	1.08	.93	2.00	13.58	5.54	11.49
5	.85	1.46	2.07	12.05	6.26	10.79
6	2.00	2.08	1.69	20.12	6.68	17.25
7	2.69	5.69	.77	17.63	17.71	7.00
8	1.15	.54	.46	11.33	4.71	8.00
9	1.00	1.69	.15	17.13	6.25	7.04
10	1.62	.54	.62	11.33	4.71	6.35
11	1.08	3.31	.85	10.97	12.63	8.87
12	.92	.46	.62	9.29	6.33	5.42
13	1.15	.69	1.15	8.91	6.23	5.89
14	.50	.85	.38	6.54	4.54	4.04

TABLE 2

FISHER-*t* SCORES INDICATING THE RELIABILITY OF THE DIFFERENCES BETWEEN THE MEANS FOR GROUP 1 (*n*—13), GROUP 2 (*n*—14) AND GROUP 3 (*n*—14) OF THE EXCESS DISTANCE AND THE TIME TO WATER SCORES FOR DAYS 1-5

Groups days	Excess distance			Time to water		
	1-2	2-3	1-3	1-2	2-3	1-3
1	1.85	2.68	1.14	.44	1.58	1.42
2	.84	1.97	2.33	1.60	.02	1.59
3	.72	.83	1.38	1.71	1.07	.96
4	.29	1.41	1.17	2.12	1.86	.41
5	.45	.35	.99	1.59	1.79	.35

tion of the excess distance scores indicates that Group 3, the group receiving the preliminary drink at the goal previous to the run, learned the most rapidly. The results do not indicate complete statistical reliability. In the excess distance scores, the Fisher-*t* of 2.33 between Group 1 and 3 on the second day was the largest *t*-score obtained. It seems that the differences might have been more clear if the problem had been more difficult for the animals. All

three groups of animals learned much more rapidly than would have been expected. This same field has been used for a number of different experiments (2, 3) in the last four years and all three of these groups of animals learned faster than would have been expected. Assuming that the stock did not suddenly get brighter or that some La Marckian shift did not take place which made adaptation to the field more rapid, it seems plausible that the animals already knew a great deal about the field even though their behavior had been definitely restricted to the square of the field in which was the water. If I may be pardoned phrasing the problem in somewhat anthropomorphic terms, the animals knew what to do; they had 10 days of practice when thirsty in drinking from the eudiometer tube. They also knew, although probably not so well, where the goal response could be consummated; they had 10 days of practice in drinking on one corner of the field. Therefore, the only problem remaining for the animals was how to get from a new spot on the field to the place on the field where the water could be drunk. This turned out, from the standpoint of the animals, to be a simple problem.

Let us analyze the behavior from the standpoint of a shift in the form of the behavior as being one essential of the learning process. In this experiment the essential pattern of behavior has already been laid down by the preliminary practice of drinking from the tube on the field. The problem then becomes the rôle of the anticipatory goal response in shifting that portion of the form of the behavior concerned with rapid and efficient locomotion from one portion of the field to another. An inspection of the excess distance scores shown in Table 1 indicates that even on the first day the animals of Group 3 were definitely better than the animals of the other two groups. There was again a noticeable drop on the second day to a relatively high degree of efficiency and from this point the animals progressed slowly. The time scores also indicate the sudden efficiency of performance on the second day, after only one practice from the start of the field. Although Group 3, the animals of which received the preliminary drink at the goal, was somewhat more efficient than Group 1 in 11 of the 14 days of the experiment, the only significant differences are in the early days of the experiment. The animals of Group 3 ran faster to the water in every trial than did the animals of Group 1, but again the early trials are particu-

larly significant, showing how much faster the animals learned who had the preliminary drink at the goal toward which they were moving. Thus we can make the suggestion that the preliminary drink serves two functions in directing the form of the learning process: (*a*) it motivates the animal toward greater activity, (*b*) it serves to evoke the actual goal responses, i.e., the consummatory responses formerly made only at the goal, and a portion of these goal responses then are actually present immediately before, and perhaps during the locomotor responses involved in running the maze.

Let us examine the evidence for the suggestion that the preliminary drink serves to motivate the organism toward greater activity in the field. Obviously the time scores should show the greater speed in running demanded if this suggestion is valid. An inspection of Table 1 shows that in 26 out of a possible 28 cases the animals of Groups 3 and 2 took less time to the goal than did the animals of Group 1 who did not have the preliminary drink. We also have evidence from previous studies (3, 4, 5), and from the work of Hull (8), and Morgan and Fields (11), that this suggestion is true.

Let us examine the other suggestion that the preliminary drink serves to evoke a portion of the consummatory responses made formerly only at the goal and these consummatory responses, or the proprioceptive impulses which accompany them, are the actual behavioral strata which are conditioned. The fact that Groups 3 and 2 learned more rapidly than did Group 1 makes this suggestion, which is the mechanism suggested by Hull (8) to account for maze learning behavior, seem probable. The fact that Group 3 learned more rapidly than did Group 2 may be due to the fact that the handling of the animals of Group 2 before the run may have served as a brief inhibitor of the learning process. If this was not the case we may follow Guthrie's analysis (6) and suggest that the cue provided by water-at-the-finish, is of greater significance than the cue provided by water-given-by-hand, since the former more nearly approximates the original drinking situation.

It is also possible to interpret the results in terms of field theory, as perhaps Tolman (14) might. The giving of the preliminary drink confirms the "expectation" of the animals that mastery of the field signifies the goal which will satisfy the thirsty animals. It seems that these theorizers concerning the learning process are thus closer to indicating the same behavioral basis of learning

than is sometimes thought, because their terminology is different.²

Let us return to the point that was briefly mentioned earlier in the paper concerning the rapid mastery of the field by all three groups of animals who had the experience of drinking on the field for 10 days before they actually moved from one end where there was not water, to the other end where they had drunk. All the animals who had this preliminary practice in drinking on the field learned so rapidly in comparison to other animals who received practice in drinking in their living cages, that one is forced to suggest that the data are somewhat comparable to the "latent learning" experiments of Blodgett (1) and Tolman and Honzik (15). These data can be seen more easily in Figures 3 and 2 than in tabular form. The group marked "control" on these figures is taken from previously published data (2). In comparison to these other data obtained using the same field and different animals, it seems that practice in drinking on the field is just as significant for the animals as practice running on the field and then drinking. This observation, of course, is limited to this simple field problem.

If there has been no other factor, or factors, affecting these data, then we have another demonstration of "latent learning." If we analyze this behavior in terms of a shift in the form of the learning process, it seems possible that perceptually the animals have largely solved the problem before they have actually moved from one end of the field to the other. After all, this should not be too difficult a problem for white rats, even admitting their none too efficient visual processes.

But this perceptual learning, if it be admitted, does not fall easily into conditioning theory, although it may be forced into systematic conditioning form. It necessitates the conditioning of fractional anticipatory goal responses to retinal-cerebral processes rather than to locomotor-kinesthetic responses. There is no evidence to present that this conditioning to the retinal-cerebral processes does not take place. It may be the actual mechanism which operates, but it seems that this shift in the form of the perceptual process as learning continues is more easily accounted for in other systematic organizations, such as those of Renshaw and Schwarzbek (12), or of Humphrey

²The paper by Professor Hull read at the Unity of Sciences meetings held at the University of Chicago, Sept., 1941, confirms this view.

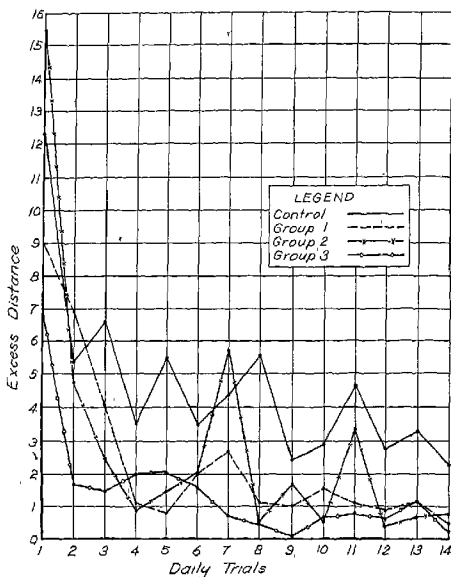


FIGURE 2

THE AVERAGE EXCESS DISTANCE SCORES FOR GROUP 1 (WATER AT FINISH ONLY); GROUP 2 (ONE-HALF C.C. OF WATER GIVEN BY HAND WITH EYE-DROPPER BEFORE RUN); GROUP 3 (ONE-HALF C.C. OF WATER DRUNK BY ANIMAL AT FINISH BEFORE DAILY TRIAL); CONTROL AND PRELIMINARY PRACTICE IN DRINKING ON THE FIELD)

(10), than in conditioning theory. This statement does not imply that conditioning theory is "wrong" or "invalid." It does imply that because certain psychological processes have been emphasized, e.g., locomotor and kinesthetic aspects of the form of the learning process, rather than organizational and perceptual aspects, behavior theory may need to be modified in order to incorporate other pertinent phenomena.

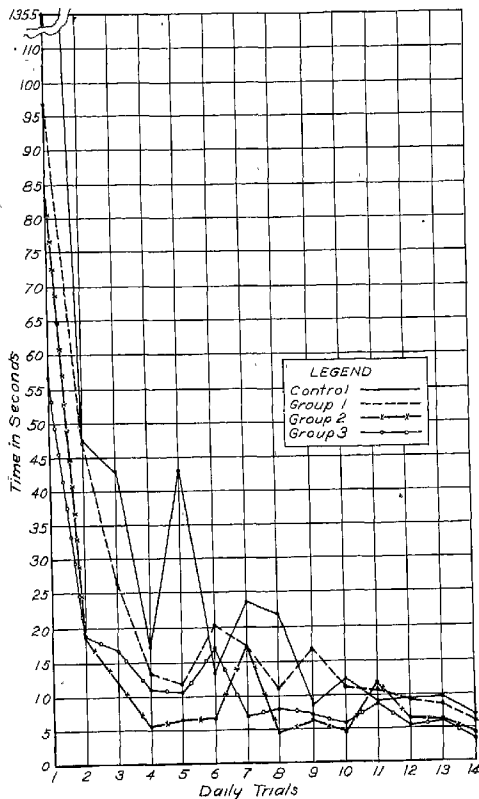


FIGURE 3

THE AVERAGE TIME IN SECONDS FOR GROUP 1 (WATER AT FINISH ONLY); GROUP 2 (ONE-HALF C.C. OF WATER GIVEN BY HAND WITH EYE-DROPPER BEFORE RUN); GROUP 3 (ONE-HALF C.C. OF WATER DRUNK BY ANIMAL AT FINISH BEFORE DAILY TRIAL); CONTROL (NO PRELIMINARY PRACTICE IN DRINKING ON THE FIELD)

SUMMARY

Rats were given 10 days practice in drinking in one square of a field which was later the goal-square. They were divided into three groups, and the group which was given a small amount of water before the run in the goal-square learned more rapidly than did animals who received a small amount of water by hand before the practice on the field. Those animals who received the water by hand, in turn learned more rapidly than did those animals who received no water previous to the run. These data provide evidence for the significance of the anticipatory goal responses in the learning process. The fact that all three groups who had the practice in drinking on the goal square before practice in the field learned more rapidly than did animals who did not have this practice is evidence for the importance of the retinal-cerebral processes of perception in the form of the learning response.

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SHORT ARTICLES AND NOTES

The Journal of Genetic Psychology, 1943, 63, 177-181.

THE SIGNIFICANCE OF THE IQ VARIABILITY IN RELATION TO AGE ON THE REVISED STANFORD-BINET SCALE*

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Terman and Merrill (2) point out that "the standard deviations of *IQ*'s fluctuate around a median value slightly in excess of 16 points and . . . at each age the values agree closely for the two scales." Figure 1 confirms this quite clearly. They continue: "Since inspection of the values reveals no marked relationship between *IQ* variability and *CA* over the age range as a whole, we may accept 17 points as approximately the representative value of the standard deviation of *IQ*'s for an unselected population." They call attention to the atypically low variability at age six (12.5) and the high variability at age 12 (20.0) and suggest that the low variability at age six might reside either "in the character of the sampling at that age" or "it might be an artifact of the nature of the scale at that level." They suggest that the variability at age 12 might be ascribed to "the differential age of the onset of pubescence" and conclude that ". . . the true variability is approximately constant from age to age."

Inspection of Figure 1 reveals the presence of a rather consistent directional trend which begins at year $2\frac{1}{2}$ and reaches its nadir at year six. From this point variability increases steadily until age 12 when the trend seems to disappear. In view of the peculiar features of this curve we may not be justified in assuming that these fluctuations are attributable solely to chance or that they are only "irregular" (2).

*Received in the Editorial Office on January 22, 1942.

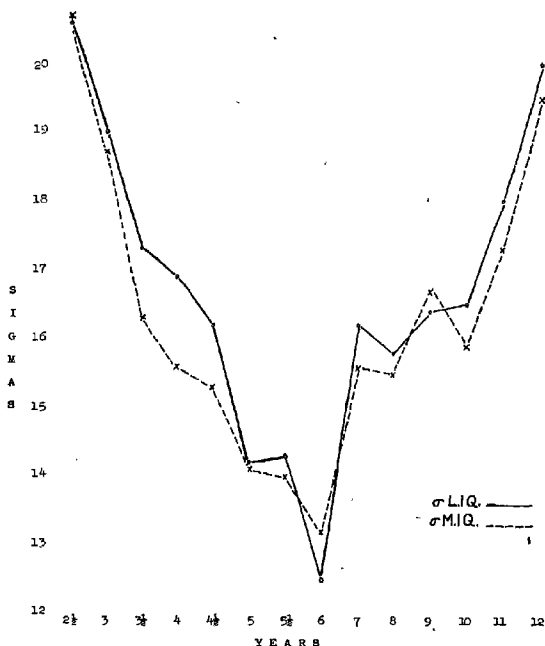


FIGURE 1
IQ VARIABILITY IN RELATION TO AGE

Terman and Merrill's assumption that the variability at age six might reside in the character of the sampling is not corroborated by our results with 1,000 Form *L* tests on kindergarten children who were tested at the mean age of 5 years 9 months. Our sigma of 12.5 is identical with that reported by the authors and leads us to believe that the sampling of the standardization group at this age is not an atypical one. To argue that the low variability at age six might be "an artifact of the nature of the scale" disregards

the diminishing variabilities from ages $2\frac{1}{2}$ to 6 and the increasing variabilities from ages 6 to 12.

Are the differences between variabilities at various points on the curve significant? We applied Snedecor's (1) "F" test of the significance of differences between variabilities with the results shown in Table 1. These data reveal that the differences in six cases are very

TABLE 1
SIGNIFICANCE OF THE DIFFERENCE BETWEEN REVISED STANFORD-BINET IQ
VARIABILITIES AT VARIOUS AGE LEVELS

Year levels	Difference between signas	F	Significance
2 to $2\frac{1}{2}$	3.9	1.52	$P < 1\%$
$2\frac{1}{2}$ to $3\frac{1}{2}$	3.3	1.41	$P > 1\% < 5\%$
2 to 3	2.3	1.29	$P > 5\% < 1\%$
3 to 4	2.1	1.26	$P > 5\% < 10\%$
3 to $4\frac{1}{2}$	2.8	1.37	$P > 5\% < 1\%$
$3\frac{1}{2}$ to 5	3.1	1.48	$P < 1\%$
4 to 6	4.4	1.82	$P < 1\%$
$4\frac{1}{2}$ to 6	3.7	1.67	$P < 1\%$
6 to 7	3.7	1.67	$P < 1\%$

significant since only once or less in 100 trials would random sampling give a difference of this magnitude. In two cases the differences are significant at the 5 per cent level, since only five times in 100 trials would a random sampling give a difference of this size. The difference between variabilities at two and three years does not appear to be statistically significant. We are justified in stating therefore that these differences are *not* due to chance.

Any acceptable interpretation of these findings must rest upon the broad assumption that general intelligence, as measured by the Stanford-Binet scale, presupposes a roughly comparable cultural environment for all testees. Variability indicates that relatively wide differences in brain structure, nutritional status, social and economic conditions, sense organ acuity, and emotional stability exist in the tested population. Otherwise (assuming that we possessed a perfect measuring instrument) no variability would be expected in a group homogeneous with regard to hereditary and environmental antecedents.

We assume further that all cultures possess hierarchies of symbols and artifacts (e.g., the range from common laborer to skilled scientist) and that "intelligence" tests attempt to measure the indi-

vidual's aptitude for norm interiorization at some level in this hierarchy. In general terms these levels range from idiocy to genius but actually they refer to either social or economic attainment possibilities. The molding influence of cultural pressure upon the development of thought-modes (i.e., thinking, problem-solving, situation-interpretation, etc.) is too complex for adequate analysis in the adult. In young children this process of cultural norm interiorization, as it affects intellectual development, may still be observable.

In the light of these suppositions we are prepared to advance the hypothesis that Terman and Merrill's data show the effects of increasing cultural pressure upon the growing child. It is largely between the ages of $2\frac{1}{2}$ and 6 years that the child is subjected to a barrage of commands and interdictions which stress conformity and discourage deviations from the cultural ways-of-regarding the social scene. In this situation the parents represent the nodal point in a complex pattern of economic, religious, and social values. The diminution in variability may reflect the objective results of this process.

At the time he enters school the child is suddenly thrust into a unique milieu. He is required to make a number of complex social adaptations which, possibly upon a permutative basis and depending upon the number and variety of personalities in his environment, result in further emergence of personal characteristics which contribute "spread" to any distribution of human traits. The process of individualization is furthered by the heterogeneity of educational stimuli in the classroom which offers opportunities for the differential development and expansion of specific abilities and aptitudes. Education, far from being "the great leveller," actually produces and encourages individual differences and variability. We doubt if a similar phenomenon would be observed in the highly regimented schools of a totalitarian government. The decreasing variability observed up to year six may represent the functioning of authoritarian but civilizing forces. Increasing variability from 6 to 12 years might then result from the interaction between a complex organism and relatively broad opportunities for differential development in a democratic group atmosphere.

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MR. JANUS ON CHILDREN'S LANGUAGE

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In a recent number of this Journal, Mr. S. Q. Janus (1) reported an investigation which set as one of its problems the testing of Piaget's hypothesis that language in early childhood is predominantly egocentric. Mr. Janus' conclusions with regard to Piaget's hypothesis are negative. He says: (p. 56) "At all ages from 18 months to 66 months, considerably more language is devoted by children to social manipulation than to egocentric remarks." "There is no justification in the evidence as yet uncovered for the predilection of assigning an *ego-centric* rôle to early verbal behavior. . . . As with adults, so with children, language is most of all an effective tool in promoting social organization" (p. 58).

These are important conclusions. Coming at the end of a 58-page article, they are likely to be thought to be supported by very extensive data. The question which we wish to ask is whether the 57 pages which precede the conclusions actually support them.

Certain facts concerning the gathering of Mr. Janus' data need to be brought to light. The most important fact is that Mr. Janus limited his observations of language to the language which occurred in six specified play situations. Certain important requirements were embodied in the selection of four of the six situations. In Situations I, II, III, IV, it was required that the children be "joined in a common sustained activity, or playing in each other's presence, manipulating toys or materials, maintaining the group structure with a dominant and directed leadership, or without subordinating their interests to those of any leaders, and *conversing with one another in a direct exchange of ideas* or by common voluntary consent." In a fifth defined play situation, the subjects were pairs of children "*engaged in sustained joint activity*, either indoors or out-of-doors, sharing the toys or materials, directly coöperating with each other, and *centering their conversation about their common interest*, requesting each other's help, directing each others actions and the like."

the investigation under consideration with this merit would be to overlook another failure to present data on a very critical point, namely, on the significance of his differences. Psychologists are so aware of the necessity of determining whether or not a difference is significant that one hesitates to mention a matter so commonplace. Yet it is a fact that not a single figure in any of Mr. Janus' extensive tables bears any accompanying measure of variability. Not one of his tables shows the number of subjects or the number of observations on which it is based. Mr. Janus tells us how many children were enrolled in each nursery school; he does not tell us how many of these children got themselves into his specified play situations or how often they did so.

Piaget has been justly criticized for his naïveté with regard to statistics. Nevertheless, Piaget had this excuse, that he was primarily presenting hypotheses, not data. The scanty data which he gave were meant to illustrate, not to prove. Later writers who attempt to check on Piaget's hypotheses have no such excuse. Their conclusions should follow from their data. Mr. Janus' conclusions, as we have seen, do not meet this requirement.

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BOOKS

The *Journal of Genetic Psychology*, the *Journal of General Psychology*, and the *Journal of Social Psychology*, will buy competent reviews at not less than \$2 per printed page and not more than \$3 per printed page, but not more than \$15.00 for a single review.

Conditions. Only those books that are listed below in this section are eligible for such reviews. In general, any book so listed contains one or more of the following traits: (a) Makes an important theoretical contribution; (b) consists largely of original experimental research; (c) has a creative or revolutionary influence in some special field or the entire field of psychology; (d) presents important techniques.

The books are listed approximately in order of receipt, and cover a period of not more than three years. A reviewer must possess the Ph.D. degree or its equal in training and experience.

Procedure. If among the books listed below there is one that seems important to you, you are invited to write a review of that book. It is not necessary to make arrangements with the Editor. Just send in your review. It does not matter if the book in question has been reviewed before.

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CRITICAL REVIEWS OF RECENT BOOKS

The Journal of Genetic Psychology, 1943, **63**, 189-194.

(Fromm, E. *Escape from Freedom*. New York: Farrar & Rinehart, 1941. Pp. 305.)

REVIEWED BY BERNHARD J. STERN

Dr. Fromm's book has been welcomed with some enthusiasm as one of the first effective efforts to emancipate psychoanalysis from the thralldom of the instinct theories of Freud, by considering behavior in the context of the entire personality and in the setting of the whole social situation. It offers more than the traditional psychological and sociological interpretation of behavior for it utilizes Marxian concepts as well as psychoanalytic insights and seeks to blend the two approaches. This in itself is an objective so commendable that the book would deserve more than passing consideration. But the work is not a mere excursion into methodology. It addresses itself to the meaning of freedom for modern man, to the problem which is the most important facing all mankind—the cause of the rise of fascism to power.

Such discussion is fraught with political import. The author realizes this for he speaks of his book having "a bearing on our course of action" (p. viii). It is in this frame of reference then that I shall attempt to evaluate the book.

Dr. Fromm's thesis is reiterated with innumerable variants throughout the present work. Briefly, it is this. When at the end of the Middle Ages the economic basis of Western society underwent radical changes, there were accompanying radical changes in the personality structure of man. Capitalism gave the individual freedom from the "regimentation of the corporative system" but simultaneously "by losing his fixed place in a closed world, man loses the answer to the meaning of his life." He is beset with deep feelings of "insecurity, powerlessness, doubt, aloneness, and anxiety."

The buttressing ideologies of the period of the Reformation, formulated in the teachings of Luther and Calvin, gave expression to the feelings of the middle class and were similarly ambivalent. They stressed freedom from the authority of the Roman Church yet offered

an escape from the burden of freedom by making the individual feel himself to be a worthless, powerless tool in the hands of God.

As capitalism developed it furthered the process of individualization, or what the author designates as "freedom from" but this, he says, helped to sever all ties between one individual and the other and thereby isolated and separated the individual from his fellow men. The individual's "aloneness," characteristic of the type of personality which came into existence in the Fifteenth and Sixteenth Centuries is, according to the author, intensified by monopolistic capitalism which has freed the individual from all traditional bonds.

Dr. Fromm then interrupts his interpretation of the social situation to present his views on the underlying individual psychological mechanisms involved in the effort to escape from "aloneness and powerlessness." Such mechanisms he finds rooted in "sado-masochistic" drives which, he argues, are not necessarily neurotic. "As a matter of fact," he writes, "for great parts of the lower middle class in Germany and other European countries, the sado-masochistic character is typical and . . . it is the kind of character structure to which Nazi ideology had its strongest appeal." The mechanisms of escape which he regards as culturally significant and important for an understanding of fascism, he classifies somewhat ambiguously as authoritarianism, destructiveness, and automaton conformity.

As he proceeds with the discussion of the psychology of Nazism, he continues to underscore man's isolation in the contemporary world. He declares, "Psychologically, his (man's) readiness (!) to submit to the Nazi regime seems to be due mainly to a state of inner tiredness and resignation which . . . is characteristic of the individual in the present era even in democratic countries." He acknowledges parenthetically that without the support of big industry and the Junkers, Hitler could not have won and that the support of these groups was based on their understanding of their economic interests rather than in psychological factors. But he lays primary stress upon the psychological reactions of the middle class, threatened by monopolistic capitalism. "Its (the middle class) anxiety and therefore its hatred were aroused; it moved into a state of panic and was filled with craving for submission to as well as for domination over those who were powerless." This is postulated as the major cause of the success of fascism.

The lugubrious themes of "aloneness" and the "illusion of individuality" persist in the concluding chapter on "Freedom and Democracy." In fact the mood of defeat becomes intensified. "Because we have freed ourselves of the older overt forms of authority, we do not see that we have become prey of a new kind of authority. We have become automatons who live under the illusion of being self-willing individuals. . . . Modern man is starved for life. . . . The despair of the human automaton is fertile soil for the political purposes of Fascism."

What is, to the author, the antidote for this despair, lest fascism envelop the world? It is "positive freedom" which consists "in the spontaneous activity of the total integrated personality." This he considers to be "the one way in which man can overcome the terror of aloneness without sacrificing the integrity of his self, for in the spontaneous realization of the self, man unites himself anew with the world—with man, nature and himself. Love is the foremost component of such spontaneity . . . love as a spontaneous affirmation of others, as the union of the individual with others on the basis of the preservation of the individual self."

This summary capitulation of the book merely suggests its all-pervasive defeatism and the author's romantic, perfectionist standards of "positive freedom" which nurtured this defeatism. The full context of the book gives an even more pronounced sense of gloom.

It is very doubtful whether the realities of the situation justify such defeatism. The basic premise of the book is questionable. The half-truth of man's "aloneness" is reached by regarding man's relationships with his fellow men as being exclusively in the economic sphere, in the employer-worker, or buyer-seller relationships. While these relationships are of primary importance, it is fallacious to ignore other associations in our society with which an individual identifies himself and from which he derives a sense of belonging in a manner that cushions the effects of the impersonality of capitalist relationships. One would gather from Dr. Fromm's presentation that primary bonds had been entirely dissolved, and that when individuals accept authority they do so always to escape, and never in the process of growth. Nowhere is due recognition given the fact that persons can find real self-fulfillment by participation in disciplined, organizational efforts for the attainment of positive freedom

as well as of freedom from coercion. When the author acknowledges that trade unions not only improve the economic position of the workers but have "the important psychological effect of giving him a feeling of strength and significance in comparison with the giants he is dealing with," he is quick to qualify this admission.

Although Dr. Fromm's discussion of the religious doctrines of the Reformation in class terms will undoubtedly be refreshing to his American readers who have not previously been introduced to these controversies, which have long agitated European scholars, his presentation is by no means conclusive. Its inadequacies arise primarily because his chief concern is with the middle class, and because he has overdrawn the similarities and ignored the fundamental differences in the position of the middle class during the rise of capitalism as compared to its status in the period of monopoly capitalism. In fact, the author's absorption with the middle class, as if it were the crucial, determining factor in contemporary society, both in the maintenance of democracy and in the coming of fascism, gives the book its sense of unreality.

There is an ingenuous admission of purposeful distortion in one significant passage which reads: "Since this book is devoted mainly to freedom as a burden and danger, the following analysis being intentionally onesided, stresses that side of Luther's and Calvin's doctrines in which this negative aspect of freedom is rooted: their emphasis on the fundamental evilness and powerlessness of man" (p. 74). It will be recalled that Dr. Fromm conceives of his book as having relevance to social action. What values to social action are there in presenting an intentionally one-sided analysis of "freedom as a burden and danger?" Was it not this type of *Weltmerz* psychology that paralyzed many German leaders of the Weimar Republic and made them ineffective in the fight against fascism? Is not the author unjust to the people of Germany and even to the members of its middle class by minimizing their heroic resistance to fascism, which filled the Nazi concentration camps to overflowing, by picturing this resistance as the response of the small minority, while exaggerating the readiness of the population to submit to the Nazi regime?

Moreover, what help can a mass movement struggling for positive freedom, and not escaping from freedom, get from leadership which

says, as does Dr. Fromm, that socialism in Russia "has become a deceptive word; for although socialization of the means of production has taken place, actually a powerful bureaucracy manipulates the vast mass of the population; this necessarily prevents the development of freedom and individualism, even if government control may be effective in the economic interest of the majority of the people." The morale and heroism of the Soviet people in recent months has shown the manifest fallacy of this statement and of the reasoning which led to its formulation. Guerilla fighters are not manipulated by a bureaucracy, nor were the civilians in the defense of Moscow. Was it not the same aversion to disciplined organizational activity, irrespective of its purposes, and the author's primitivistic longing for spontaneity, which led him to write that "Freedom is not less endangered if attacked in the name of anti-Fascism or in that of outright Fascism?"

In the scant presentation of his positive program, Dr. Fromm speaks vaguely of "a planned economy in which the whole nation has mastered the economic and social forces," and one that extends beyond socialization of the means of production. But he does not trouble to tell the reader how this planned economy is to be achieved. In fact in this discussion, he does not even refer specifically to the need for the elimination of class exploitation and its concomitants in human misery. He ends, as he begins, with the doubtful theme: "Man does not suffer so much from poverty today as he suffers from the fact that he has become a cog in a large machine, an automaton, that his life has become empty and lost its meaning."

But life *has* meaning today for millions of people as it never has had before in human history. Nowhere does the author give a clew to the real and valid spirit of vitality accompanying the development of modern science which occurred simultaneously with the rise of capitalism. Millions of people are not seeking to escape from a freedom which they have not yet even attained. They are just beginning to perceive a hope of eliminating poverty, which is still very real, of controlling diseases which still plague them, of dissipating ignorance which enthalls them and hence, of living fuller freer lives. In a democracy they can identify themselves with such organized agencies as express their purposes. They can fight fascism with zest, because *life has not only not lost its meaning*, but

because *life is just beginning to unfold*, and they are coming to be active agents in its unfolding.

My critical remarks have been directed to the political arguments and connotations of the book under review because these are its core and its substance. However, I am in sympathy with the author's efforts to formulate a theory of social character, which underscores the dynamic adaptation of human nature to the structure of society. While at times in his discussion of this problem the author neglects to apply his oft-asserted acknowledgment of the influence of class stratification, his theoretical analysis represents one of the most challenging treatments of this difficult subject. It will undoubtedly serve as a point of departure for further critical controversy which will occasion clarification in a much mooted field.

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THE PEDAGOGICAL SEMINARY AND
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(OVER)

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Provincetown, Massachusetts

Entered as second-class matter, August 3, 1897, at the post-office at
Worcester, Mass., under the Act of March 3, 1879

Reentered as second-class matter May 11, 1937, at the post-office at
Provincetown, Mass., under the Act of March 3, 1879

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THE MAZE BEHAVIOR OF CHILDREN AS AN EXAMPLE OF SUMMATIVE LEARNING*

Institute of Child Welfare, University of California

M. B. BATALLA

In an earlier study in this series¹ the "common path" technique was used in investigating children's learning in a body maze. For a situation in which "insight" was possible, the results emphasized the tendency of children to rely upon overt trial and error and a part-by-part learning of the maze. Even after extended experience with simple maze patterns, there was little evidence of behavior which could be interpreted as even vaguely "insightful," or as showing an understanding of the "field relationships" of the maze.

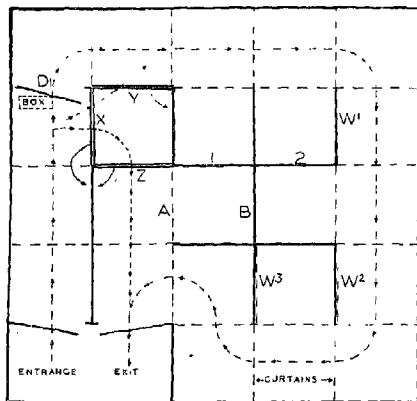
In the present study a similar problem is investigated with the following variation in method: (a) The children were trained to run a maze without error. (b) The maze was then altered in such a way that a short-cut to the goal was readily possible. In this altered situation behavior may involve (a) a stereotyped adherence to the earlier long route; (b) a short-cut response. The latter behavior is not necessarily indicative of insight in each individual case since a short-cut response may occur without recognition of the actual rôle of the short-cut in the spatial complex. Supplementary indications of insight have, however, been sought in the observational records of attentive responses, hesitation, and sudden "changes of pace" in running the maze.

A. EXPERIMENTAL SITUATION

A 25-unit life-size alley maze (Figure 1) was constructed in the yard of the Institute of Child Welfare. Each unit was three feet square, with walls six feet high. The following features may be quoted:

*Accepted for publication by Harold E. Jones of the Editorial Board, and received in the Editorial Office on January 29, 1942.

²Acknowledgments are due to Dr. Harold E. Jones for the direction of this study and to the personnel of Works Progress Administration Official Project No. O.P. 65-3-5406-4428 for clerical and other assistance.

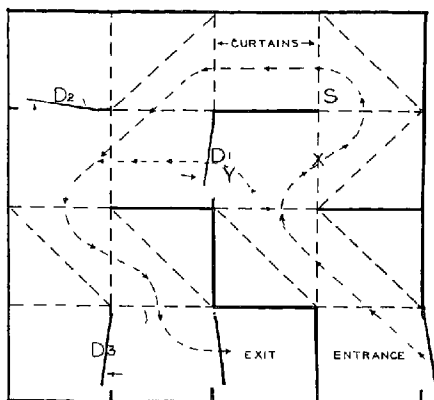


MAZE I FIGURE 1

FIGURE 1

DIAGRAM OF THE LIFE-SIZE ALLEY MAZE

1. Entrance-to-exit pathways are designated by broken lines with arrows. D_1 is a door at the end of the third unit of the maze.
2. The walls of each unit consisted either of tongue-and-groove redwood (indicated by solid lines) or of curtains (indicated by right-angled broken lines). The curtains were of heavy blue denim, suspended from overhead rods and reaching the floors.
3. W_1 , W_2 , and W_3 indicate wooden walls covered with curtains, a device to increase difficulty of the long path through making barriers similar in appearance to the open pathways.
4. At X , Y , and Z the wooden walls were hinged; during the preliminary training runs (along the long route indicated by a fine broken line) these walls were in the position shown in Figure 1; they could not be opened nor otherwise entered by the subject. During the test runs, however, the three walls were folded back in the direction indicated by the arrows, permitting unobstructed passage through X , Y , or Z ; the exit could now be reached by the short-cut through Z .



MAZE 2 FIGURE 2

FIGURE 2

DIAGRAM OF THE LIFE-SIZE ALLEY MAZE

Maze 2 (Figure 2) was a smaller, 16-unit life-size alley maze. In this maze, during the preliminary training runs, the door D_1 could be opened by the subject only when he was on the side indicated by the arrow. In the test runs, D_1 was propped open and could be entered from either side; D_2 and D_3 were additional doors which at all times could be opened only in the direction indicated by arrows.

The experimental procedure was determined by an experimenter concealed behind a screen in a third story window overlooking the maze; he recorded the path taken by the child, the time taken for each run, and noted significant overt behavior. Specific behavioral criteria were employed in designating responses as "direct" or "hesitant." In these experiments the child was not blindfolded. In the construction of the maze care was taken to avoid, within the maze, specific visual cues which would differentiate parts of the spatial complex. It was possible for the child to obtain a general orientation by looking upward at trees and at the tops of

buildings which were within his field of view from all sections of the maze; there was, however, very little evidence of the systematic or even of the casual use of such cues.

B. EXPERIMENTAL GROUPS AND PROCEDURE

1. *Experiment I*²

The subjects were 47 sixth-grade children (see Table 1 for chronological and mental age data). In this experiment preliminary trials were given in the long path (indicated by arrows) until each subject had three consecutive errorless trials (the criterion for learning the maze). Entries into blind alleys, time, and number of trials were recorded. A rest interval preceded the crucial test run. During this interval an assistant opened the three hinged walls (Figure 1, X, Y, and Z) and placed a box in front of D_1 . The purpose of the box was to serve as an obstruction, making it more difficult to go through D_1 into the accustomed long route, and also making more certain the observation of the adjoining open path at X. The same verbal instruction "*See how quickly you can find the way out*" was given before the first training run and before the first critical run.

2. *Experiment II*

An additional group of 20 sixth-grade children was utilized in this experiment. The training period was extended, a series of from 11 to 15 runs being required after the maze had been learned by the criterion of three errorless runs. The purpose of this was to increase familiarity with the maze, and to determine the effect of overlearning upon subsequent behavior in the short-cut situation.

3. *Experiment III*

This group consisted of 21 younger children (nursery school "graduates") with an average age of 6.8 years. The procedure for the group was the same as for Experiment I.

4. *Experiment IV*

Twelve preschool children, average age 3.7 years, were included

²Experiments I, II, III, and IV were given with Maze 1 (Figure 1) and Experiment V was given with Maze 2 (Figure 2).

TABLE 1
SAMPLING DATA, AND ERROR AND TRIAL SCORES

Expt.	N	CA			MA			Errors			Trials		
		Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
I	47	11.4	.5	10.1-12.5	11.6	1.0	9.0-13.5	12.7	7.1	0-34	4.6	2.7	1-11
II	20	11.6	.4	11.0-12.3	11.8	1.2	9.5-14.6	12.8	15.5	2-74	5.6	4.5	1-18
III	21	6.8	1.4	4.5-9.2	8.1	1.9	5.6-13.8	14.8	12.2	2-45	6.8	4.6	1-20
IV	12	3.7	.6	2.8-4.8	4.7	.7	3.5-5.8	22.0	8.6	6-38	10.1	5.0	2-19
V	31	5.9	1.8	3.2-11.2	6.7	2.5	3.5-13.3	30.8	34.6	2-137	10.3	8.1	2-32

in this experiment. In order to maintain interest with these younger children, a spaced distribution of trials was used, six trials a day; otherwise the procedure was the same as in Experiment I.

5. *Experiment V*

This was a mixed group of 31 children with an age range of from 3 to 11 years, average 5.2 years. The younger (nursery school) children in the group were given the same procedure as in Experiment IV, but using Maze 2. The older children, coming to the Institute only on Saturdays, were given the preliminary learning trials on one day, with additional "refresher" trials a week later, followed by the critical test runs.

The children, as a whole, were highly motivated. In a few cases, with the nursery school children, there were minor emotional upsets, limited to the initial trials. Motivation was maintained in Experiments III, IV, and V with marbles and jacks which were shown to the subject at the beginning of the experiment and given to him after the trials were completed.

C. RESULTS

1. *Preliminary Learning*

In Table 1 error and trial scores can be compared for the various experiments. Very little difference can be seen in learning scores of the sixth grade children (Experiments I and II) as compared with the elementary school children in Experiment III. A more definite age factor, however, appears in Experiment IV with the nursery school group; moreover, in this group the data include only those cases that learned the maze, since it was necessary to omit results for a number of the younger nursery school children who were either unable or unwilling to learn the maze by the criterion stated. In this particular experimental situation three years may be taken as the lowest limit of effective maze performance.

Experiment V (on a different maze) yields results which cannot be directly compared with those of the other experiments. Maze 2 was more difficult, chiefly because of the complicated arrangement of the doors.

Figures 3 and 4, with learning curves computed in terms of Vin-

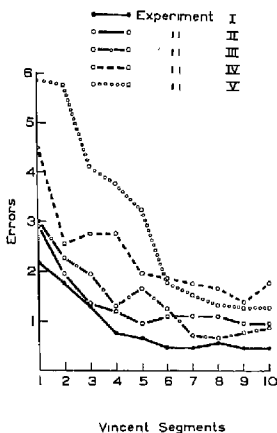


FIGURE 3
LEARNING CURVES IN TERMS OF ERRORS

cent segments (2) gave indications somewhat similar to those of Table 1.

2. Results from the Short-Cut Trials (Test Runs)

From the point of view of the effort involved, the complexity of the route and the distance covered are probably less important than the task of thrusting aside the curtains which hang across the corridors at frequent intervals (Figures 1 and 2). In the long route it was necessary to open a door (D_1) and to push through 14 curtains after D_1 was passed. With the walls X , Y , and Z removed it was now possible to enter the long route either through D_1 or through the open spaces X and Y , but even with this latter route the distance from X to the exit section was approximately 30 feet, with 11 intervening curtains. It was also possible, from X , to turn directly to the exit, reaching the last section within five feet and passing only one curtain. From their previous learning records, it was clear that the children were motivated to reach the exit, and not

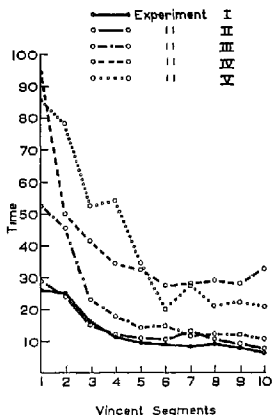


FIGURE 4
LEARNING CURVES IN TIME (SECONDS)

to linger within the maze nor to make repeated excursions into blind alleys. If, then, their prior experience in the maze had given them an understanding of its "field relationships" and a "perceptual pattern in which the parts of the field were related spatially and temporally" (3), we would expect them to be correctly oriented upon passing *X*, and to turn promptly toward the exit. It may be observed that prior to the test runs each child had frequent opportunities to note that the entrance and the exit doors are adjacent.

The short-cut test results are indicated in Tables 2 to 6 in terms of percentages of the groups falling under four behavior patterns (classified on the basis of observational data):

- A. The short-cut route taken directly.
- B. The short-cut route taken with hesitation or delay at the critical point.
- C. The long route with hesitation at the critical point.
- D. The long route taken directly.

Table 2 indicates that 64 per cent of the children in Experiment I

TABLE 2
PERCENTAGES OF TEST RUNS: EXPERIMENT I

Test Runs	Short route		Long route	
	A. Direct	B. With delay	C. With delay	D. Direct
1	0	64	21	15
2	60	13	4	23
3	66	17	2	15
4	81	2	0	17
5	85	2	2	11
6	87	2	2	9
7	92	0	0	8
8	94	0	0	6

$N = 47$, age 10.1-12.5.

TABLE 3
PERCENTAGES OF TEST RUNS: EXPERIMENT II

Test Runs	Short route		Long route	
	A. Direct	B. With delay	C. With delay	D. Direct
1	0	50	25	25
2	65	15	5	15
3	80	5	5	10
4	85	5	0	10
5	90	0	0	10
6	90	0	0	10
7	90	0	5	5
8	90	0	0	10

$N = 20$ age 11.0-12.3.

TABLE 4
PERCENTAGES OF TEST RUNS: EXPERIMENT III

Test Runs	Short route		Long route	
	A. Direct	B. With delay	C. With delay	D. Direct
1	0	24	52	24
2	19	19	24	38
3	24	10	24	38
4	38	10	14	38
5	48	5	0	48
6	48	0	5	48
7	48	5	5	43
8	52	0	0	48

$N = 21$ age 4.5-9.2.

took the short-cut "with hesitation," on the first test trial; 21 per cent took the customary long route after observable delay (going through either D_1 or X and Y); and 15 per cent, in spite of the obstacle placed in the long route, moved into this accustomed path-

TABLE 5
PERCENTAGES OF TEST RUNS: EXPERIMENT IV

Test Runs	Short route		Long route	
	A. Direct	B. With delay	C. With delay	D. Direct
1	0	25	75	0
2	8	8	17	67
3	17	8	33	42
4	17	0	17	67
5	17	25	8	50
6	25	17	8	50
7	33	0	8	58
8	33	0	8	58

$N = 12$ age 2.8-4.8.

TABLE 6
PERCENTAGES OF TEST RUNS: EXPERIMENT V

Test Runs	Short route		Long route	
	A. Direct	B. With delay	C. With delay	D. Direct
1	7	52	42	0
2	19	52	13	16
3	52	23	7	19
4	58	19	3	19
5	71	7	0	23
6	71	7	7	16
7	74	3	0	23
8	81	0	0	19

$N = 31$, age 3.2-11.2.

way through D_1 directly and without delay. There were no cases of children who passed through X and turned toward the exit in an unhesitating manner; the observer's protocols suggested that those who reached the exit by the short route appeared, for the most part, to do so by a renewed trial-and-error exploration (which frequently led them into the blind alley B) rather than by a confident "inferential expectation" that they would find the exit in a predicted spot. On the second test run, however, 60 per cent shifted to a direct and unhesitating preference for the short route. This percentage increased gradually in successive trials, but even on the eighth trial a few remained fixated on the long route. After the fourth trial relatively little shifting occurred.

Table 3 presents, for Experiment II, results which are closely similar to those of Experiment I. It is clear that the effect of extended training, with a greatly increased opportunity to become familiar with the "field relationships" of the maze, is not to improve

performance with regard to the short route. As a matter of fact, those who have had extended training seem slightly less likely to take the short route on the first trial (50 per cent as compared with 64 per cent) and slightly more likely to take the long route with complete disregard of changes in the maze (25 per cent as compared with 15 per cent). Over-learning has apparently tended to result in mechanical fixation rather than in a greater readiness for "insightful" reaction.

In Table 4, we may note in the case of younger children a much smaller proportion of short-cut runs in the additional test trial. Although they have been nearly as adept as the sixth grade children in the preliminary learning, they appear more "conservative" in adapting to changed conditions. Even after eight test runs, approximately one-half of the group remain fixated on the long route.

Striking age differences are also suggested when we compare Table 5 with Tables 2 and 3. In the first test run, all of the younger children respond to the changes in the maze by delay or hesitation; unlike some members of the older groups, none are so habitized as to plunge directly into the long route disregarding the open walls and the obstacle at D_1 . On the other hand, relatively few of these younger children (25 per cent as compared with 64 per cent in Experiment I) are sufficiently insightful or sufficiently exploratory to accept the short route on this first test run, and even after eight test runs only one-third have discovered the short route.

Table 6 shows the results with Maze 2. In this experiment all of the children, during the earlier exploratory phases of the training series, had on one or more occasions passed through D_1 in the "wrong" direction (i.e., away from the exit). In spite of this familiarity with the short-cut (in reverse), 42 per cent of them took the long route in the first critical trial, and even after eight trials 19 per cent remained fixated on the long route. The observational notes on test runs for this experiment were of particular interest; some children started through the D_1 short-cut but halted in apparent bewilderment, turned back, and took the long route. Others hesitated at the critical point, went forward into the long route as far as S_1 , hesitated again, peeked through the curtains as though surveying the learned long route, and then returned to take the short-cut. In some of these maneuvers there were on the part of a few

children possible indications of an "insightful" grasp of the field relationships of the maze. They appeared to understand (not at first, but after hesitation and inspection) that the change in the walls of the maze offered a genuine short-cut into the end sections of the maze. But this behavior was exceptional; much more commonly, the subjects responded at the critical point by going forward into the long route, or by entering the short-cut in an exploratory manner, as though starting a new course of trial and error on a completely new maze.

D. SUMMARY

Five experiments were conducted in which children were trained in a body maze; after the maze was learned (by the criterion of three successive errorless trials) clearly obvious changes were made in the maze pattern; the effect of these was to enable the child to go to the exit by a much shorter route. The experiments included a variety of procedures, several samples of children, and two different maze patterns. In the five experiments, from one-third to three-quarters of the children persisted in the long route in the first critical test. Those who successfully achieved the short-cut on the first test run apparently did so primarily as the result of a continuation of the process employed in the preceding period of trial and error learning. In successive test runs, a gradual shift occurred toward the short-cut, in the usual form of a trial and error learning curve. These results could not be attributed to inadequate experience in the maze, since it was shown in Experiment II that extended practice, in the preliminary learning trials, was not favorable to a flexibly adaptive or "creative" response in the critical test runs.

The attempt to explain maze learning in more elaborate terms, involving the development of a "structured" reaction to the total maze pattern, may find some support in the records of a few children, especially in the older groups, who show at least rudimentary indications of "insight." It seems probable that a sharp dichotomy between trial-and-error and insight cannot be defended, and that intermediate processes occur. Dr. H. S. Conrad has suggested the term "guess-sight" as appropriate for behavior compounded of guess and insight, or involving a more or less confused mixture of trial-and-error, speculation, hypothesis, and dim understanding. The

present experiment is not well adapted to making a precise discrimination, in the individual, of these various intergrading forms of response. But for the group as a whole (and this applies to the older as well as the younger members) evidence points to the predominance, in this situation, of piecemeal learning and of achievement based on summation of elements.

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1

A STUDY OF COOPERATION, DOMINANCE, GROOMING, AND OTHER SOCIAL FACTORS IN MONKEYS*¹

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C. J. WARDEN AND WILLIAM GALT

A. INTRODUCTION

There are two general approaches to the study of the social behavior of primates. (a) Field studies of the animal community in its native habitat. Studies of this type have been made by Carpenter (2, 3) on the howler monkey and the gibbon, by Zuckerman (34) on the baboon, by Nissen (18) on the chimpanzee, and Bingham (1) on the gorilla. (b) More restricted, experimentally controlled studies of social functions where the animals are living under the more or less artificial conditions of captivity. In field studies the animals are living under natural conditions but usually the observations are sketchy, and adequate controls are impossible. When the animals are studied in captivity, the matter of controls is simplified but the social activities themselves may be considerably distorted. For example, Yerkes and Yerkes (33) make the point that: "There can be no doubt that primary sexual activity is encouraged and intensified, as are also social conflicts of various sorts, by the conditions which usually obtain in captivity and especially by the presence of human observers."

The study of social reactions of primates in captivity has been limited very largely to social facilitation, food-sharing, cooperation, dominance, and grooming. The review of Crawford (6) covers the experimental work up to 1939. In general it has been found that social facilitation occurs in both monkeys and apes under a variety

*Received in the Editorial Office on February 12, 1942.

¹This report covers one topic in a project on *Social Facilitation in Monkeys* (under the direction of Professor C. J. Warden), supported by the Council for Research in the Social Sciences of Columbia University. Thanks are due The Lifwynn Foundation for granting part-time leave of absence to the junior author.

The general method employed was devised by the authors in collaboration. The junior author carried out the tests and tabulated the data, and the senior author is responsible for the final report.

of conditions. Both food-sharing and coöperation have been demonstrated only in the chimpanzee. Various patterns of dominance-submission have been reported in groups of different sizes for both monkeys and the great apes. The importance of grooming in both of these groups has been emphasized by numerous investigators. The more recent work on dominance by Yerkes and his students is reviewed in the 1941 monograph of Nowlis (19).

B. PROBLEM AND METHOD

The present study includes problems covering coöperation and social facilitation, dominance, grooming, and other social factors. The results relating to these various factors will be discussed in separate sections. Since the subjects used and the general conditions of the experiment were the same throughout the study, these will be described here.

1. Subjects¹

Nine monkeys were used in the present study. There were four cebus (*Cebus capucina*), three rhesus (*Macaca mulatta*), and two sooty mangabey (*Cercocebus fuliginosus*) monkeys. Cebus Nos. 1 and 2 had been living at the Columbia laboratory for several years prior to the opening of the experiment and were quite tame. The three rhesus monkeys had also been living in the laboratory for some time. Cebus Nos. 1 and 2 and Rhesus No. 3 had received training on the following problems prior to the opening of the present experiment: (a) patterned string task (22), (b) imitation problem (24), (c) complex discrimination problem (12), (d) instrumentation on a single platform (23), and (e) instrumentation on multiple platforms (25). Rhesus No. 1 had been used on all the above except (b), while Rhesus No. 2 had been used on all except (d) and (e). It will be noted that none of these previous studies dealt with social responses such as would involve the behavior of two animals while in a single cage. The other two cebus monkeys, Nos. 3 and 4, were bought from Henry Trefflich and Company, animal importers, approximately nine months before the opening of the experiment. The two sooty mangabeys were purchased from the same dealer eight months before the experiment began and were from the time of purchase housed in the Columbia animal laboratory. It was

decided to include the mangabeys among the experimental animals after a conference with Dr. Schroeder of the Bronx Zoological Park, New York City, since he thought this species might be especially suitable as subjects in a study of coöperation.

At the time of the beginning of the experiment all animals were moderately tame and were thoroughly accustomed to the experimenter, to the experimental set-up, and to the procedure. Throughout the study the animals were housed in the primate quarters of the Columbia laboratory and were given the diet and care which has been standardized in this laboratory and reported in detail in earlier communications (4, 9). A general description of the animals is given in Table 1.

TABLE 1
DESCRIPTION OF MONKEYS

Monkey	Sex	Age (years)	Weight (ozs.)	Living condition
Cebus 1	M	5½	56	With Cebus 3
Cebus 2	M	6	80	Alone
Cebus 3	M	5	56	With Cebus 1
Cebus 4	M	6	76	Alone
Rhesus 1	F	6	148	With Rhesus 3
Rhesus 2	M	5	146	Alone
Rhesus 3	F	6	156	With Rhesus 1
Mangabey 1	M	4	162	With Mangabey 2
Mangabey 2	F	4	164	With Mangabey 1

The experimental apparatus consisted of a reaction-cage 30 inches in all dimensions with a platform extending 30 inches outward in front of the reaction-cage. By means of a pulley device, a sliding panel between the cage and platform could be raised and lowered. When the sliding panel was up, the platform was separated from the reaction-cage by a brass grille consisting of a series of bars ¼ inch in diameter and placed approximately 1½ inches apart. The animals were able to work effectively through the bars but were unable to escape from the cage. The reaction-cage and platform were painted white and properly lighted. A silk screen separated the experimenter from the reaction-cage and the work platform. An illustration of the cage will be found in an earlier paper (23). A 16-inch Westinghouse fan was run continuously at high speed to serve as a sound screen. The tests were made in a dark room well separated from the living quarters of the animals.

The experimental conditions differed somewhat in the analysis of the several problems. For this reason further details as to the procedure will be given in connection with the discussion of results on the several topics.

C. COÖPERATION

This experiment was an attempt to carry over to the monkey the simplest of the test situations used by Crawford (5) in his study of coöperation in the chimpanzee. In the first part of the test a large wooden box weighted with lead bars was used. The box had two cords attached to it which led into the cage described above. Two food cups were attached to the box about 15 inches apart in such a way that food could be secured by each animal if they stood side by side and pulled the box in. The box was placed at the end of the platform 27 inches from the cage on all tests. As the arm-reach of the animals is approximately 9 inches, it was necessary for them to pull in the box 18 inches to secure the food.

Each animal was trained at first to pull in the weighted box (10 lbs.) by the cord nearest him. The weight of the box was then increased by stages (5 lbs. or less) until the animal was unable to move it. The maximum scores for strength of pull for the six animals used on this problem are shown in Table 2. As will be seen, the weight-pull ratios are very high, indicating that monkeys are remarkably strong. It is interesting to note that all the animals, ex-

TABLE 2
SHOWING MAXIMUM PULL OF EACH ANIMAL BEFORE PAIRED TESTS

Monkey	Weight (lbs.)	Maximum load pulled (lbs.)	Weight- pull ratio	Work done (ft.-lbs.)
Cebus 1	3.5	26	1 to 7.4	23.86
Cebus 2	5.0	31	1 to 6.2	28.45
Cebus 3	3.5	31	1 to 8.4	28.45
Cebus 4	4.75	23.2	1 to 5.0	21.30
Rhesus 1	9.25	66.5	1 to 7.2	60.85
Rhesus 2	9.12	91.5	1 to 10.0	84.0
Rhesus 3	9.75	86.5	1 to 8.5	78.15
Mangabey 1	10.12	66.5	1 to 6.6	61.04
Mangabey 2	10.25	31.0	1 to 3.0	28.46

The coefficient of friction of the box was approximately .612.

The distance of pull was $1\frac{1}{2}$ feet.

The work done in ft.-lbs. was for one complete pulling in of box.

The unit of increase in the region of maximum load was 2 lbs.

cept one of the mangabeys, shifted from the use of both hands to the teeth, in pulling, as the load approached the maximum. After once shifting to the teeth, they continued to pull in this way no matter whether the load was light or heavy. The mangabey that did not use the teeth, consistently refused to pull the cord so that a small dowel stick had to be substituted for it. The stick was, of course, less suitable for manipulation with the mouth and this probably explains her failure to shift. This shift did not occur in similar tests reported by Crawford (5) on the chimpanzee.

When the animals had reached their maximum pulling capacity, they were placed together in the cage by pairs as follows: (a) Cebus Nos. 2 and 3; (b) Rhesus Nos. 1 and 3; (c) Mangabey Nos. 1 and 2. These pairings were selected because neither of the members had exhibited marked dominance and they thus seemed most likely to give positive results in the coöperation tests. The cebus monkeys were both males, the rhesus monkeys both females, and the mangabeys, male and female. No inter-species pairings were attempted since there was marked difference in dominance of one type of monkey over another. Each pair was given from 10 to 14 sessions, of one-half hour each, to see whether or not they would work together in pulling in the box now weighted above the maximum pull of the stronger animal. The members of each pair lived together during the experiment.

There was no evidence of spontaneous coöperation in the case of any of the three pairs. Sometimes both animals would pull on the cords at the same time but their pulling was rarely if ever co-ordinated. When the weight was decreased somewhat, so that one animal could budge the box a little, the other monkey would often pick up the other cord and pull but never in unison with the first animal. If the first monkey failed to move the box, the second would usually wait until the other had stopped pulling before picking up his cord. This is essentially the type of behavior described by Crawford (5) for chimpanzees when first introduced into a similar situation.

It was then decided to give the monkeys tuition according to the method described by Crawford. In this stage, two small boxes with food cups and cords attached were placed side by side on the platform. The boxes were weighted lightly so that each could be pulled

in readily by the proper animal. The first step in tutoring was to try to get the animals to pull simultaneously on the two boxes. Each pair was given from 10 to 12 10-trial sessions. The rhesus and mangabey pairs learned readily to pull in the two boxes simultaneously with fair consistency. The cebus pair failed because Cebus No. 1 developed a dominant attitude and punished Cebus No. 3 whenever the latter picked up his cord.

The animals were now shifted back to the heavy box. But again the second animal would not start pulling unless the first animal caused the box to budge. There was no evidence of improvement in the simultaneous pulling of the cords on the large box when it was too heavy for either animal to move alone.

In the next stage, the experimenter attempted to get the animals to coordinate their activity by getting behind the large box and shouting "pull" and pushing on the box at the same moment. This type of training was continued through 13 to 15 sessions, interspersed with a number of sessions with the two box set-up. All three pairs, unlike Crawford's chimpanzees, failed to profit by this tuition. As a rule both animals would pick up the cord at once but they did not coordinate their pulling effectively. One or another of the animals might pull when the experimenter gave the signals and a few times both pulled together for a few jerks. However, such synchronizing as occurred with any two animals appeared to be a matter of chance and not real cooperation. The nearest approach to cooperative behavior would seem to be the synchronizing of the pull of a single animal with the push and signal of the experimenter.

Much of the behavior described above involves social facilitation, since it was determined in part by the presence of the other animal or the experimenter. The activity of Cebus No. 1, described above in the two-box stage, is clearly a case of competition. This factor showed up in a much more striking manner in the later tests on dominance.

D. DOMINANCE RELATIONSHIPS

The reaction-cage described above was utilized in the study of dominance. Each monkey was first trained to pull in, by means of a cord, a small weighted box with food cup attached. The choice food of each type of animal was used as the incentive. This consisted

of a small square of apple for the rhesus and cebus monkeys and a small square of banana for the mangabeys. After this habit was well established, the monkeys were placed in the reaction-cage in pairs. Two baited boxes with cords attached rested on the platform about 27 inches in front of the barred cage. The boxes were weighted (15 lbs. for rhesus and mangabey, 10 lbs. for cebus) in order that they could not be pulled in too rapidly, thus allowing more time for a display of dominance behavior. In each test the shutter separating the cage from the platform was raised and the reactions of the animals in attempting to secure the food were recorded. As a rule the tests lasted one minute or less unless such activities as grooming and mounting intervened. Ten tests were given in each day's session. The dominance rating of each pair was based upon no less than five sessions or 50 tests. Where the dominance relationship was not clearly evident, many more sessions were necessary in order to establish a stable rating.

The dominance factor showed itself both in the attitude of an animal to its mate and its reaction toward the food. The former might include threatening, striking, and fighting activity, and the latter an attempt to pull in both boxes and secure all the food. Complete notes were taken covering the behavior of both members of a pair on each test. A systematic analysis of this material enabled us to construct a scale with a range from equality to extreme dominance. This scale, representing four degrees of relationship, may be described as follows:

1. *Zero*—Each animal pulled in his own box and secured the food without interference.
2. *Slight*—The dominant animal allowed his mate to pull in his box but took the food himself.
3. *Strong*—The dominant animal prevented his mate from pulling in his box by snarling, biting, cuffing, mauling, or pouncing upon him. The dominant animal usually secured the food from his mate's box before pulling in his own.
4. *Complete*—The dominant animal took an aggressive position in the front of the cage while his mate sat either passive or cowering in a corner at the rear. The dominant animal was thus completely unopposed in securing the food from both boxes.

Since nine animals were used, 36 pairings were theoretically possi-

ble. However, Cebus No. 4 died early in the experiment and was used in only one pairing, hence the total number of combinations was 29. These may be divided into two main groups for purposes of analysis: 8 intra-species pairings, 21 inter-species pairings. It will be convenient to discuss the results of these two types of pairings separately.

1. *Intra-species Pairings*

The results of the tests involving intra-species pairings are given in Table 3. As will be noted, the first four columns of scores indi-

TABLE 3
SHOWING DOMINANCE SCORES FOR VARIOUS ANIMALS (INTRA-SPECIES PAIRINGS)

Pairs	Total tests	1st member	2nd member	Neither	Degree of dominance	
		of pair dominant	of pair dominant	member dominant	1st member	2nd member
A. Cebus 1 & 2	64	0.0%	91.0%	9.0%	—	2
B. Cebus 1 & 3	229	88.0	3.0	9.0	4	2
C. Cebus 2 & 3	50	88.0	12.0	0.0	4	2
D. Cebus 3 & 4	50	0.0	75.0	25.0	—	4
E. Rhesus 1 & 2	152	0.0	96.0	4.0	—	4
F. Rhesus 1 & 3	284	35.0	21.0	44.0	2	2
G. Rhesus 2 & 3	141	97.0	1.0	2.0	4	2
H. Mangabey 1 & 2	281	11.0	24.0	65.0	4	4

Column 1 indicates the total number of tests, columns 2 to 4 the percentage of tests for each dominance relationship. The two final columns indicate a general rating of the characteristic degree of dominance of each animal of a pair. This rating was based on the behavior of the animal, on those tests on which it was dominant, as evaluated by the scale on page 219.

cate the incidence of the dominance relation in various pairings. For example, Cebus No. 2 (Pair *A*) was dominant over Cebus No. 1 in all of the 64 tests. On the other hand, Rhesus No. 1 (Pair *F*) was dominant over No. 3 in only 35 per cent of the 284 tests, the opposite relationship obtaining in 21 per cent of the tests, while no clear dominance was shown in about half the tests (44 per cent). In only one case (Pair *A*) was one animal dominant over the other in every test. In several cases neither member of a pair was dominant in many of the tests, as indicated in Column 4. A simple order of dominance based on relative incidence can be demonstrated in both the rhesus (*E*, *F*, *G*) and the cebus (*A*, *B*, *C*) groups. In terms of percentage of tests, the order of dominance in the cebus monkeys

was No. 2, No. 1, and No. 3. The order among the rhesus was also No. 2, No. 1, and No. 3.

In the last two columns of Table 3 will be found the ratings made on the intensity or degree of dominance manifested. These values are based on an analysis of the behavior of each animal on those tests in which it exhibited dominance. The types of behavior involved in each degree of dominance are described in the scale given above. It was fairly easy to determine, from the extensive notes on behavior, the characteristic degree of dominance of each animal. This was true because the dominant animal reacted to a given mate nearly always in much the same manner. The values given in the table represent, therefore, a fairly objective index of the degree of dominance commonly displayed. As will be seen, all ratings fall either in Degree 2 (slight) or Degree 4 (complete). This means that while Pattern 3 (strong) occurred on occasion, it was never characteristic in any of these pairings. There is a rough correlation between the incidence (percentage of times dominant) and the degree (intensity) of dominance. This means that when an animal was dominant on the majority of tests it showed a high degree of dominance, while a low incidence score usually meant a low degree of dominance. The mangabeys (Pair *H*) appear to be the only exception to this trend. Although neither of these animals showed a high incidence score, the degree of dominance of both was of Pattern 4. These animals had been living-cage mates for a year or more and this may account for the fact that dominance was complete when exhibited at all.

2. *Inter-Species Pairings*

The results of the tests on inter-species pairings are given in Table 4. It will be seen that each of the three rhesus monkeys was dominant in all pairings with the other two types, in terms of incidence scores. In the rhesus-*cebus* pairings there was only one case in which the rhesus monkey was not dominant in 100 per cent of the trials. In the rhesus-mangabey pairings the incidence of dominance ranged from 65 per cent to 100 per cent in favor of the rhesus. The *cebus* and mangabeys while never dominant over the rhesus, occasionally scored "equal." In pairings with the *cebus*, the mangabeys showed a higher incidence of dominance in five out of the six cases. The exception was *Cebus* No. 1 when paired with Mangabey

TABLE 4
SHOWING DOMINANCE SCORES FOR VARIOUS ANIMALS (INTER-SPECIES PAIRINGS)

Pairs	Total tests	1st member of pair dominant	2nd member of pair dominant	Neither member dominant	Degree of dominance 1st member	Degree of dominance 2nd member
Cebus 1 & Mangabey 1	53	5.0%	93.0%	2.0%	3	4
Cebus 1 & Mangabey 2	55	47.0	37.0	16.0	4	4
Cebus 2 & Mangabey 1	61	2.0	98.0	0.0	3	4
Cebus 2 & Mangabey 2	50	6.0	84.0	10.0	3	4
Cebus 3 & Mangabey 1	50	0.0	100.0	0.0	4	4
Cebus 3 & Mangabey 2	50	0.0	100.0	0.0	4	4
Rhesus 1 & Cebus 1	77	57.0	25.0	18.0	4	4
Rhesus 1 & Cebus 2	50	100.0	0.0	0.0	4	—
Rhesus 1 & Cebus 3	50	100.0	0.0	0.0	4	—
Rhesus 2 & Cebus 1	51	100.0	0.0	0.0	4	—
Rhesus 2 & Cebus 2	51	100.0	0.0	0.0	4	—
Rhesus 2 & Cebus 3	50	100.0	0.0	0.0	4	—
Rhesus 3 & Cebus 1	50	100.0	0.0	0.0	4	—
Rhesus 3 & Cebus 2	50	100.0	0.0	0.0	4	—
Rhesus 3 & Cebus 3	50	100.0	0.0	0.0	4	—
Rhesus 1 & Mangabey 1	72	98.6	0.0	1.4	4	—
Rhesus 1 & Mangabey 2	87	70.0	0.0	30.0	4	—
Rhesus 2 & Mangabey 1	50	100.0	0.0	0.0	4	—
Rhesus 2 & Mangabey 2	63	65.0	0.0	35.0	4	—
Rhesus 3 & Mangabey 1	51	98.0	0.0	2.0	4	—
Rhesus 3 & Mangabey 2	50	84.0	0.0	16.0	4	—

Column 1 indicates the total number of tests, columns 2 to 4 the percentage of tests for each dominance relationship. The two final columns indicate a general rating of the characteristic degree of dominance of each animal of a pair. This rating was based on the behavior of the animal, on those tests on which it was dominant, as evaluated by the scale given on page 219.

No. 2. This reversal of relationship may have been due in part to the fact that Cebus No. 1 was caged with Cebus No. 3, a very submissive animal, and showed a striking development of aggressiveness during the series of tests.

As indicated in the table, the ratings on intensity of dominance all fall in either Degree 3 (strong) or Degree 4 (complete). The rhesus monkeys always showed complete dominance when paired with either of the other two types. Moreover the mangabey exhibited complete dominance when paired with the cebus on all tests in which it exhibited dominance. As a rule the cebus monkeys rated Degree 3 (strong) when dominant over the mangabeys. They tended to snarl and cuff at the mangabeys since the latter showed no disposition to fight back. However, the situation was very different with the rhesus who were quick to punish under attack.

It is interesting to note that inter-species dominance proved to be more uniform and complete than intra-species. In the latter pairings, dominance was more likely to shift from one member of the pair to the other during a series of tests. When animals of different species were paired, however, the dominance relationship was usually definite and fixed almost from the start. This would seem to mean that the species dominance was more readily recognized and accepted by the submissive animal.

A number of observations were made concerning qualitative differences in the dominance behavior of the three types of monkeys. The rhesus monkey usually established dominance in the first few tests by biting, cuffing, or pouncing upon its mate. After that the other animal customarily retired to the rear of the cage leaving the rhesus in complete command. In the cebus monkey dominance was less certain and largely vocal, although they sometimes struck at the other animal. They often uttered plaintive cries when attacking. The mangabeys possessed a mild temperament and never attempted to hurt another animal even under aggression. These two specimens were large and, instead of fighting, were likely to crowd out the other animal and snatch the cords and food. In a special series of tests with the mangabey pair it was arranged so that No. 1 did all the pulling but only No. 2 could secure the reward. There was no sign of animosity between the two animals although for five successive trials No. 1 did all the work and No. 2 secured all the reward.

We found no indication that dominance was determined solely by any single factor such as sex, weight, or strength. While Rhesus No. 2 (male) was usually dominant over Rhesus Nos. 1 and 3 (females), Mangabey No. 2 (female) was more often than not dominant over Mangabey No. 1 (male). Rhesus No. 2 weighed considerably less than No. 3, but he was markedly dominant over No. 3 as well as over No. 1. The weight-pull ratio (Table 2) was lower for Cebus No. 1 than for Cebus No. 3, yet the former was completely dominant over the latter.

The dominance relationship was often established during the first experimental session (10 tests). This was especially likely to be the case in the inter-species tests in which dominance was marked. The relation might be established by a show of physical force but this was not always true. In fact the more aggressive animal was not necessarily the dominant one. For example, in the early tests Cebus No. 2 attacked Mangabey No. 2 consistently but the latter secured all the food on most of the trials. In general, once dominance was established it tended to remain fixed. As will be shown in the following section, even radical brain operations had relatively little influence on the dominance status.

Further evidence bearing on the strength and stability of the dominance relationship was secured under a variation of the test conditions. A wire-mesh partition was placed in the reaction-cage thus completely separating the two animals from one another. The mesh allowed close physical proximity but prevented the dominant animal from attacking or securing the food of the other. Only those pairs were included in these tests in which one animal was markedly dominant over the other. The pairs selected for this series were: Cebus Nos. 1 and 3, Rhesus No. 2 and Mangabey No. 1, Rhesus No. 2 and Mangabey No. 2, and Rhesus No. 2 and Cebus No. 3. Two or three sessions of 10 tests were given to each pair. In spite of the presence of the partition, the behavior of the submissive animal was still greatly affected although the dominant animal could not punish him in any way. At first the submissive member refused in every case to pull in the food or even pick up the cord. In fact, at this stage it would not take the food from the floor of its cage when placed there by the experimenter. It was obvious that the presence of the dominant animal was effective here since the sub-

missive one kept watching him. This type of behavior continued with little abatement throughout the series of 20 to 30 tests.

An attempt was made to arrange the animals in a hierarchy, based on the percentage of tests in which each animal was dominant when all pairings were pooled. These ratings represent final dominance position since they were computed from the last series of 10 tests. It should be remarked, however, that the order would have been much the same if the average incidence scores (Table 4) for the entire series had been used. This means that the hierarchy was really established in the early tests and remained relatively stable thereafter. Nevertheless it seemed fairer to use the scores of the final series (10 tests) in demonstrating the hierarchy.

The order of dominance, arranged in the form of a hierarchy, is shown in Figure 1. As will be seen, the monkeys do not fall into

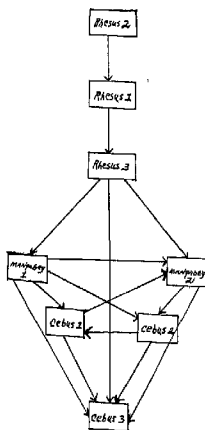


FIGURE 1

DOMINANCE HIERARCHY

a perfect, straight-line hierarchy. Nevertheless the deviation from this form was less than one might expect. The three rhesus monkeys did fall into a straight-line order: No. 2, No. 1, and No. 3. Cebus

No. 3 at the other extreme was dominated by all the animals. The straight-line relationship would also have held for the rest of the group except for one case of circularity. Cebus No. 1 was dominant over Mangabey No. 2 but the latter was dominant over Cebus No. 2, who was in turn dominant over Cebus No. 1. If Cebus No. 1 had held his usual position with respect to Mangabey No. 2, the eight animals would have fallen into a straight-line hierarchy. In such a case the order would have been: Rhesus Nos. 2, 1, and 3, Mangabey Nos. 1 and 2, Cebus Nos. 2, 1, and 3.

As a matter of fact this single deviation (Cebus No. 1) from a straight-line hierarchy was probably due to special conditions. As indicated above, this animal lived with the most submissive animal of the group (Cebus No. 3). It was obvious to the experimenter that Cebus No. 1 was gradually developing a strong aggressive attitude as the experiment progressed. This was shown toward the experimenter as well as toward the other animals. Presumably the shift in attitude arose from continually dominating Cebus No. 3 in the cage, and carried over to the test situation. This shift is clearly indicated by an analysis of the incidence scores of the entire series of pairings with Mangabey No. 2. In the first two sessions (20 tests) the latter was strongly dominant over the cebus. At the next session, which occurred about three weeks later, Cebus No. 1 had become somewhat dominant, and the incidence increased up to 80 per cent in the last session (tests 45 to 55). This would seem to show that the deviation of Cebus No. 1 from what might be called his "normal" position was due to the aggressiveness developed in living with a very submissive monkey. In any case, the "normal" inter-species order of dominance when no unusual conditions are present would seem to be: rhesus, mangabey, cebus. In general, the results of our study agree with the findings of Maslow (14, 15, 16) on monkeys, and Nowlis (19) on chimpanzees, in so far as the same factors were investigated.

Although dominance in the food-procuring situation was the only type specifically tested for throughout the experiment, it was observed that the dominant animal, as determined by these tests, almost always left the reaction-cage first when the doors between the reaction and transfer cages were opened. The animal that did not succeed in jumping first into the transfer cage was obliged to wait in the reaction-cage, with no opportunity to secure food, while the first

animal was wheeled back to his living quarters. In a very recent study of dominance in young chimpanzees Nowlis (19) has determined that these two aspects of dominance—securing food and priority in escape from the reaction-cage at the close of an experiment—correlate highly with one another. It is interesting to note that this also holds true in the behavior of monkeys both in intra- and inter-species pairings.

3. *The Effect of Frontal Lobe Injury on Dominance*

Some facts regarding the effect of frontal lobe injury on dominance have been mentioned in an earlier study (26). The brain operations were performed on three animals (Cebus No. 2, and Rhesus Nos. 1 and 3) by Dr. S. E. Barrera, Principal Research Psychiatrist at the New York State Psychiatric Institute and Hospital. The amount and position of cortex removed is given in detail in the earlier paper. The operation was performed on two animals in two stages, while on the third (Rhesus No. 3) it was done in a single stage. These three animals were paired in the post-operational tests with four normal animals: Rhesus No. 2, Cebus No. 3, Mangabey Nos. 1 and 2. This made possible a comparison between normal and post-operational dominance scores. Only 12 pairings could be made since the operated animals were not paired among themselves.

Unilateral injury had no apparent effect on the dominance relationship established earlier in the normal state. As a matter of fact, no shift occurred in the case of any of the pairs. This finding is based on no less than 30 tests for each pair in the post-operational series. The tests were made about one month after unilateral injury.

After bilateral injury a short period of about three months was allowed before post-operational tests on dominance were made. In 9 of the 12 pairings the same dominance relationship held as before. In fact, the percentage index of incidence remained almost the same. A fairly marked change in incidence ratio occurred in the other three pairings. However, the effect of the injury on the dominance relationship was not always in the same direction. For example, the incidence ratio for Cebus No. 2 increased from 2 per cent before operation to 38 per cent after operation, when paired with Mangabey No. 2. Also the characteristic degree of dominance changed from 3 (strong) to 4 (complete). On the other hand, Rhesus Nos. 1 and 3

showed a decrease in dominance after operation, when paired with Mangabey No. 2.

A complete shift in status from dominance to submission occurred only in Rhesus No. 1. In this case the incidence score decreased from 50 per cent to 24 per cent, while that of the mangabey increased from 0 to 57 per cent. The intensity of dominance of Rhesus No. 1 before operation was about rated Degree 4, whereas after the operation Degree 2 was scored about half the time. These results indicate that in most cases the dominance relationship is not disturbed even by such radical brain injury. Moreover, when a change does occur, it may be either an increase or a decrease. The stability of dominance even under such circumstances is all the more remarkable in view of the facts cited in a previous paper (26) on strength of pull. There it was shown that the ratio between the weight of the animal, and the maximum load that he would pull in, was reduced from one-third to one-half in the post-operational tests. Since the actual strength of the animals had likely not significantly changed, this reduction was thought to be due to a loss in motivation and persistence. It might be expected that these same factors would tend to decrease the dominance of the animals after brain injury. As we have seen, however, such a change of dominance rarely occurred in our animals. It might well be that a greater amount of shifting would occur after operation in animals that were originally more equal in dominance status than were ours.

E. GROOMING AND SEXUAL BEHAVIOR

Grooming in chimpanzees has been discussed at length by Yerkes (29, 33). It is his opinion "that no pattern of social behavior which involves the coöperation of at least two individuals is at all comparable to it in social significance." Grooming has been less thoroughly studied in monkeys. However, this type of behavior has been described by Carpenter (2), Ewing (8), Maslow (15), Tinklepaugh (20), Watson (27), and others. According to Watson, it is the "most fundamental and basal form of social intercourse between rhesus monkeys."

In the present study, grooming was observed in the various food-procuring situations already described. Under the test conditions, the tendency to groom thus had to compete with the tendency to

secure food. As is well known, the latter response is very strong in monkeys. As a rule each pair was together in the test cage for about 20 minutes for each session, during a series of 10 tests. The opportunity to groom was therefore fairly limited. A pair was observed for at least five sessions and some pairs were observed for as many as 45 sessions.

Considerable variation in grooming behavior was found among the several types of monkeys. The cebus showed no tendency to groom even another cebus monkey. Moreover, they appeared to become terrified or angry when a rhesus or mangabey attempted to groom them. This finding agrees with the statement of Yerkes (29) that grooming is both more common and more socialized among Old World than among New World monkeys.

Both the rhesus and mangabey monkeys were frequent and often persistent groomers. However this activity was largely limited to the intra-species pairings. For example, a rhesus monkey was never observed to groom a mangabey, or vice-versa. In only one instance did a rhesus groom a cebus. The mangabeys, however, attempted fairly often to groom the cebus. In fact, both the mangabeys even groomed a guinea pig which was placed in the reaction-cage for 10-minute periods on several occasions. The cebus monkeys seemed afraid of the guinea pig, whereas the rhesus monkeys paid little or no attention to it.

The grooming reaction appeared to be prepotent over the tendency to secure food in both the rhesus and mangabey monkeys in the intra-species pairings. This was especially true in the case of monkeys that lived in separate cages. Apparently the lack of an opportunity to groom led to a strengthening of the urge. Such animals were likely to ignore the food and begin grooming as soon as they were put in the test-cage. In fact this tendency was so strong as to interfere at times with the tests on dominance. When an animal was grooming or being groomed, it seldom or ever would reach out and get the reward until the grooming ceased, even when the latter was in easy reach.

The type of behavior which commonly occurred may be illustrated by a description of a single test of two rhesus monkeys. As the shutter was raised, No. 3 was grooming the dominant animal (No. 2). The latter picked up the right cord and started to pull

but immediately stopped as the grooming continued, although he kept the cord in his mouth. Somewhat later he dropped the cord and ceased to pay any attention to the box. After grooming had continued for about five minutes, No. 2 (male) mounted No. 3 (female) a few times. After this No. 3 kept on grooming No. 2 for about three minutes, and then they groomed each other for several minutes. Then No. 2 suddenly stopped grooming, went to the front of the cage, pulled in the boxes and ate both pieces of apple.

According to our observations, there is no consistent relation between dominance status and grooming. In some instances the dominant animal of a pair was the more persistent groomer, while in other cases the opposite was true. This agrees with the findings of Maslow on monkeys (15). Moreover, the amount of grooming does not seem to depend on the sex of the animal. The males groomed the females about as persistently as the females groomed the males. Also, animals of the same sex often groomed one another.

The question has been raised as to when grooming first appears in the life cycle of primates. Jacobsen, Jacobsen, and Yoshioka (13) found that in a young chimpanzee, isolated from others at birth, grooming appeared suddenly at the age of 39 weeks. On the other hand, Foley (10, 11) observed no grooming in a rhesus monkey reared alone during the first two years. The monkeys used in the present study ranged in age from four to six years. Some of them had been living in separate cages in the laboratory for three years or more with no opportunity for grooming. If we assume that the grooming pattern had been set up before the animals were brought to the laboratory, it is clear that it carried through this long period of isolation, to be immediately evoked in a social environment. The grooming pattern, whether innate or not, is thus surely very stable and persistent in both rhesus and mangabey monkeys.

It should be mentioned in this connection that grooming activity was disturbed by the removal of the frontal lobes. After unilateral injury, grooming occurred much less frequently. After bilateral ablation, not a single instance of grooming was observed.

Sexual activities often occurred in the test situation although somewhat less frequently than grooming. Such behavior might be initiated by either the male or female animal. The male might mount the female, or the female might present herself to the male. Since the

monkeys were somewhat pre-adolescent, copulation was incomplete. The males mounted only females of the same type. The female often responded to the anger, threats, or slaps of her male partner by the act of presentation. This was especially true in the case of the female mangabey who would present herself to a male of any of the three types.

F. SUMMARY

The following types of social behavior were tested for in a group of nine monkeys: coöperation, dominance, grooming, and sexual behavior. The group included cebus, rhesus, and mangabey types, ranging in age from four to six years. The main findings are indicated below.

1. No tendency to coöperate, either spontaneously or under tuition, was observed.

2. In the dominance tests, both intra- and inter-species pairings were tested. Intra-species dominance was somewhat less stable and persistent than the inter-species. The latter, except for special conditions, exhibited the following order: rhesus, mangabey, cebus.

3. As a rule, dominance was established early and remained stable throughout the tests. In most cases it was not disturbed even by extirpation of the pre-frontal lobes. Dominance was not determined by any single factor such as sex, weight, or strength.

4. The cebus monkeys were not observed to groom. However, grooming behavior occurred very frequently in the test situation in both the rhesus and mangabey types. Indeed, it was usually prepotent over the food-procuring response. The tendency to groom decreased markedly after unilateral injury and never occurred after bilateral injury.

5. A number of observations regarding sexual behavior in pre-adolescent monkeys are indicated.

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SOME STUDIES ON "INSIGHT" IN WHITE RATS*

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A. INTRODUCTION

Tolman and Honzik (3) presented evidence that "insight" was present in white rats when presented with a learning problem involving the elevated maze. In order to check this study and to expand the investigations, we planned three experiments as follows: Experiment *A*, to check Experiment III of Tolman and Honzik. Experiment *B*, an extension of the study using a modified maze patterned after the one used by Tolman and Honzik. Experiment *C*, an extension of the study in which the animal had to make his choice in a different situation than that of either Tolman and Honzik's study or our Experiment II. The changes or modifications used are discussed and explained under the appropriate headings which follow.

B. CENTRAL EXPERIMENTAL PROCEDURE FOR EXPERIMENTS *A* AND *B*

The three different experiments were carried out with 51 albino rats of Wistar strain between 90 and 150 days old at the beginning of the experiments. They had no previous maze experience. There were two different mazes used in the experiments. The maze used in the first experiment was identical to the one used by Tolman and Honzik in their third experiment (Figure 1, Maze 1). The blocks used to prevent entrance upon any path were transparent celluloid, mounted, or hinged at the top to wooden frames which were permanently fastened to the maze. When unlocked, the door would swing in one direction only. The block or door was always on the runway, but the animal had no way of telling when the door was locked or unlocked. The door on Path 1 was locked by means of a wire lever running below the runway and controlled from outside the maze room.

*Received in the Editorial Office on February 12, 1942.

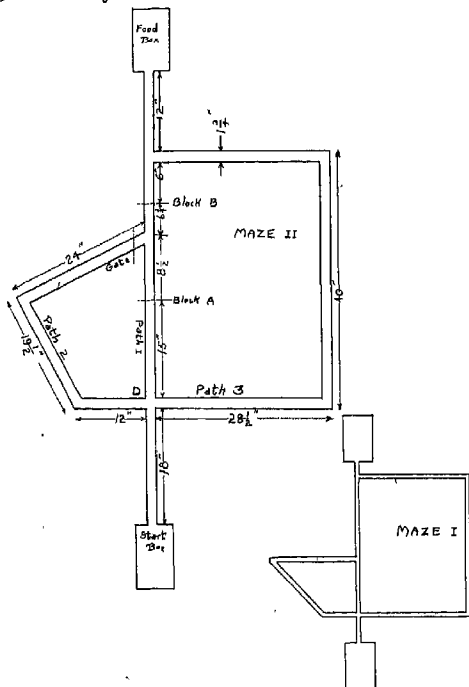


FIGURE 1

The general procedure of the experiments was divided into two parts; (a) The preliminary training period in which the animals became oriented to the maze situation and developed a strong preference for Path 1 (the shortest distance to the food box), a somewhat less preference for Path 2 and very little, or no preference, for Path 3 (the longest distance to the food box); and (b) a final test period or "insight" run. After being trained for 15 days to take Path 2 when Path 1 was blocked at A the animals were pre-

sented with "insight" run. On the "insight" run the door at *A* was moved to *B*, the common intersection of Paths 1 and 2 therefore being blocked. After going up Path 1 to block at *B* the animal returned by way of Path 1 and had to choose Paths 2 or 3. If the animal was able to perceive that the block at *B* blocked Path 2 as well as Path 1 he would then take Path 3 (the only remaining path to the food) which would indicate "insight."

After each run in the preliminary training period and the final test period the animal was fed a small piece of cheese in the food box. After the last run every day the animal was returned to the home cage where he was fed a balanced ration for 30 minutes.

C. EXPERIMENT *A* (MAZE I)

1. *Purpose*

The purpose of this experiment was to check the results reported by Tolman and Honzik (3), using an identical maze with an improved method of blocking the paths. It was thought desirable to repeat Experiment III, Group *B*, of Tolman and Honzik because of the difficulty reported by these investigators in making the animals go up Path 1 to Block *A* on every run. To eliminate this difficulty, we substituted the celluloid, hinged door for the block used in their experiment. This door remained on Path 1 at *A* at all times except on insight runs when it was moved to *B*. During the exploratory runs (Days 1-5) the door at *A* was always open. During the training period (Days 6-15) the door at *A* was open on the first, fourth, seventh, and tenth runs of each day, and closed on all other runs. Since the animal had no way of knowing on which runs the door would be open, and since he went directly to the food box over Path 1 four times each day, he always went up Path 1 to the door at *A* without any force being applied by the investigators. This completely solved the difficulty encountered by Tolman and Honzik.

2. *Apparatus and Materials*

The maze used in this study was identical to the one used by Tolman and Honzik with the change in method of blocking the paths as described above. Eleven animals were used.

3. Procedure

a. Preliminary training period. The preliminary training period was identical to that given by Tolman and Honzik in their Experiment III, Group B, with exceptions already mentioned.

b. Results of test period. The results (16th day) of the "insight" runs are given in Table 1. Taking the number of errors made

TABLE 1

"Insight" run	No. of the 11 rats that avoided Path 2
1	2
2	9
3	11

by individual rats during the three test runs, the results were as follows:

In 3 runs: 11 rats made 2 errors each
9 rats made 1 error each
2 rats made 0 errors each

c. Conclusion. In this situation we found some indication of a type of behavior which we might term "insight." This agrees somewhat with the conclusions of Tolman and Honzik.

D. EXPERIMENT B (MAZE II)

1. Purpose

In order to eliminate the possible factor of spatial learning instead of true "insight" a new maze was devised (see Figure 1, Maze II). This new maze differed only slightly from Maze III used by Tolman and Honzik and by us in Experiment A. The essential difference was in the angle at which Path 2 enters Path 1 and the difference in the distance from the intersection of Path 1 and Path 2 to the point where the animal makes his choice after returning up Path 1 from Block A.

An analysis of the maze used by Tolman and Honzik and by us led to a presupposition which caused the change made in this experiment. The rat going up Path 1 to Block A and returning to the intersection where he turned to the right in the preliminary training period has formed a position and spatial habit of turning right. In the "insight" run the animal went up Path 1 to Block B then re-

turned by Path 1. About 17 inches from Block *B*, the rat came to the intersection of Path 1 and Path 2 (this intersection was almost exactly the same distance from Block *B* as the place where choice was made when returning from Block *A* in the preliminary training period, and it was also a perpendicular turn). The animal turned up Path 2, due to the position and spatial habit to turn right after returning a certain distance from Block *A*. Being unable to transverse Path 2 because of the gate the animal had to back out on Path 1 again and proceed to intersection at *D* where he turned left on Path 3 since he had already been blocked when trying to turn right previously.

If this presupposition is correct it will account for the results of Tolman and Honzik and our first experiment which seems to indicate that rats possess some degree of "insight" in this situation.

2. *Apparatus and Materials*

The maze used in this experiment was of the elevated type used in Experiment I with slight modifications as follows:

1. The starting box and food box were farther from the intersections.
2. The paths were widened at one-and-three-fourth inches.
3. Path 2 enters Path 1 at an acute angle instead of right angle.
4. The intersection of Path 1 and Path 2 is $23\frac{1}{2}$ inches from *D*, intersection of Paths 1, 2, and 3. (The block at *B* being only 6 inches from the intersection of Paths 1 and 2.)

3. *Animals*

Twenty-six animals were used in this experiment.

4. *Preliminary Training Period*

Days 1-5 (10 runs a day). For the first five days the animals were given 10 runs a day, a total of 50 runs with the door at *A* open on all runs. At the end of this period all 26 animals showed a definite preference for Path 1.

Days 6-15 (10 runs a day). For the next 10 days the animals were given 10 runs a day, a total of 100 runs, with the door at *A* opened on the first, fourth, seventh, and tenth runs, and closed the other six runs. The animals went up to the block (door) at *A* on

every run and therefore went to the food box by way of Path 1 every time the door was open.

On the runs that the door at *A* was locked the animal was forced to turn and head toward the starting point where he chose Paths 2 or 3.

5. *Results of the Training Period*

With Path 1 blocked at *A* there were for the entire group of 26 rats 1,560 runs. Of these 1,560 runs, 1,457 (or 93.3 per cent) were over Path 2, and 103 (6.61 per cent) over Path 3. The preference for Path 2 (the shorter of the two paths) is clearly obvious.

The number of times each rat took Paths 2 and 3, with the block at *A*, is given in Table 2. Paths taken on test runs are shown in Table 3.

TABLE 2
THE NUMBER OF TIMES EACH RAT TOOK PATHS 2 AND 3 IN THE
PRELIMINARY TRAINING PERIOD

Path taken Times taken	2 1,457	3 103
Rat	Path 2	Path 3
<i>A</i>	56	4
<i>B</i>	59	0
<i>C</i>	53	7
<i>D</i>	49	10
<i>E</i>	55	5
<i>F</i>	52	8
<i>G</i>	58	2
<i>H</i>	50	10
<i>I</i>	53	7
<i>J</i>	58	2
<i>K</i>	58	2
<i>L</i>	58	2
<i>M</i>	55	5
<i>N</i>	57	3
<i>O</i>	57	3
<i>P</i>	56	4
<i>Q</i>	58	2
<i>R</i>	58	2
<i>S</i>	58	2
<i>T</i>	56	4
<i>U</i>	56	7
<i>V</i>	57	3
<i>W</i>	57	3
<i>X</i>	57	3
<i>Y</i>	56	4
<i>Z</i>	58	2

TABLE 3
PATHS TAKEN DURING THE "INSIGHT" OR TEST RUNS

Rat	Path taken Times taken	2 60	3 18
	First run	Second run	Third run
A	2	3	3
B	2	2	2
C	2	3	2
D	2	2	2
E	2	2	3
F	2	3	3
G	2	3	2
H	2	3	2
I	2	3	3
J	2	3	3
K	2	2	2
L	2	2	2
M	2	2	3
N	2	2	2
O	2	2	2
P	2	2	3
Q	2	2	2
R	2	2	3
S	2	2	3
T	2	2	2
U	2	2	2
V	2	2	2
W	2	2	2
X	2	2	2
Y	2	3	2
Z	2	2	2

6. Test Period

The "insight" runs were given on the 16th day. The results are given in Table 4.

TABLE 4

"Insight" run	No. of the 26 rats that avoided Path 2
1	0
2	8
3	10

Taking the number of errors made by individual rats during the three test runs, the results are as follows:

In 3 runs: 12 rats made 3 errors each
 10 rats made 2 errors each
 7 rats made 1 error each
 0 rats made 0 errors each

7. *Conclusions*

Not a single animal avoided Path 2 on the first (true "insight") run. The fact that seven animals chose Path 3 on the second test run and 10 on the third run would indicate a high type of "trial-and-error" learning but not "insightful" learning.

E. EXPERIMENT C (MAZE II)

1. *Purpose*

Before starting our experiments, and especially after conducting the first two experiments, we were wondering if the animals were being tested in a situation that could be solved by "insight." If we define "insight" as the ability to see that in two paths having a common section—if the common section is closed, both of these paths are useless and that only a third, alternative path, not included in this common section remains as a possible means for reaching the goal; then we have (as Tolman and Honzik did) eliminated all possibilities of the animals in Experiment I and II showing "insight" as they were forced to make their choice while facing the starting point (away from the maze situation).

By having the animals make the choice at *D* all chances of the results being due to "forced movement" (1) or spatial behavior were eliminated. On preliminary training runs as well as "insight" runs the animal turns left to take Path 2 and right to take Path 3.

2. *Apparatus and Materials*

Maze II, identical to the one used in Experiment II was used. A different method of blocking the Path was used: The door at *A* was removed and a removable block made the same as the door, only permanently locked, and with the wooden frame painted with parallel black lines so the rat would see the block when placed on the path.

3. *Animals*

Fourteen rats were used in this experiment.

4. *Preliminary Training Period*

The first five days each rat was given 10 runs a day with no block on any path. At the end of this period all 14 animals showed a

definite preference for Path 1 and had explored Path 2 and Path 3 a few times (in some cases they were forced to do so).

Days 6-15 (10 runs a day). For the next 10 days the animals were given 10 runs a day, a total of 100 runs, with Path 1 blocked at *A*. The rat learned to choose Path 2 or Path 3 immediately without trying Path 1 when the block was on Path 1. We had no trouble as all animals made every choice in preliminary and final test periods at the intersection without going up to the block, i.e., all choices were made while the animal was facing the food box enabling him to "see" the entire situation, an important factor in our estimation.

5. *Results of the Training Period*

With Path 1 blocked at *A* there were for the entire group of 14 rats 844 runs. Of these 844 runs, 763 (or 90.4 per cent) were over Path 2, and 81 (9.6 per cent) over Path 3, showing a decided preference for Path 2.

The number of times each rat took Paths 2 and 3, with the block at *A* is given in Table 5. The paths taken on the test runs are shown in Table 6.

6. *Test Period*

The "insight" runs were given on the 16th day. The results are given in Table 7.

Taking the number of errors made by individual rats during the three test runs, the results are as follows:

In 3 runs: 14 rats made 3 errors each
0 rats made 2 errors each
0 rats made 1 error each
0 rats made 0 errors each

The fact that all 14 rats chose Path 2 on all three test runs showing no "insight" seems to point to some factor other than "insight" operative in Tolman and Honzik's experiment and our Experiment I. If rats cannot show "insight" while facing the maze situation, how can they behave "insightfully" while headed away from the situation?

TABLE 5
THE NUMBER OF TIMES EACH RAT TOOK PATHS 2 AND 3 IN THE
PRELIMINARY TRAINING PERIOD

Path taken	2	3
No. times taken	763	81
Per cent	90.4	9.6
Rat	Path 2	Path 3
<i>A</i>	50	10
<i>B</i>	50	14
<i>C</i>	50	10
<i>D</i>	55	5
<i>E</i>	48	12
<i>F</i>	58	2
<i>G</i>	58	2
<i>H</i>	55	5
<i>I</i>	57	3
<i>J</i>	56	4
<i>K</i>	57	3
<i>L</i>	57	3
<i>M</i>	57	3
<i>N</i>	55	5

TABLE 6
PATHS TAKEN DURING THE "INSIGHT" OR TEST RUNS

Path taken	2	3	
No. times taken	42	0	
Rat	First run	Second run	Third run
<i>A</i>	2	2	2
<i>B</i>	2	2	2
<i>C</i>	2	2	2
<i>D</i>	2	2	2
<i>E</i>	2	2	2
<i>F</i>	2	2	2
<i>G</i>	2	2	2
<i>H</i>	2	2	2
<i>I</i>	2	2	2
<i>J</i>	2	2	2
<i>K</i>	2	2	2
<i>L</i>	2	2	2
<i>M</i>	2	2	2
<i>N</i>	2	2	2

TABLE 7

"Insight" run	No. of the 14 rats that avoided Path 2
1	0
2	0
3	0

F. SUMMARY

The results of our Experiment *A* support to some degree the conclusions of Tolman and Honzik. The results, we believe, however, are due to spatial and position habits formed by the animal during the learning period rather than to "insight." The results of our Experiment *B* seem to validate this conclusion, since there was a far less degree of what might be interpreted as "unsightful" behavior exhibited by the animals in this experiment when these factors were eliminated.

There was no "insight" shown in our Experiment *C*. Since, in our opinion, this experiment furnishes the best, if not the only, condition in which it would be possible to exhibit "insight," we must conclude that there is not "insight" present in white rats in the situation used in these studies.

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THE EFFECT OF REPROOF IN RELATION TO AGE IN SCHOOL CHILDREN*¹

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A. INTRODUCTION

Experiments on motivation have established that reproof for poor performance of a task can influence subsequent performance of that task. It has also been demonstrated that this effect is related to age. Hurlock (3, 4, 6), for example, found that reproof augmented performance on intelligence tests more for eighth grade children than for either fifth or third grade children. Anderson and Smith (1), repeating, on the same subjects, an experiment made by Chase (2) three years previously, obtained results with a motor task which indicate that effect of reproof is related to age. None of these studies, however, covered an age range extensive enough to show how reproof changes in effectiveness over the period from early childhood through adolescence.

The object of the present study was to determine the relative effect of reproof upon children of varying school ages in the primary and secondary school systems. Reproof was administered in connection with an arithmetic task and a motor task, and its effect was noted on both immediate and subsequent performance of these tasks.

B. METHOD

1. *Subjects*

Two hundred and thirty-four children enrolled in Grades 3 and 6 of the Oxford Elementary School and 9 and 12 of the University

*Received in the Editorial Office on February 19, 1942.

¹This article is an abridgment of a master's thesis presented in psychology at the University of Mississippi. The thesis was under the direction of Prof. John B. Wolfe.

The author is indebted to Supt. R. C. Cook of the University High School and Supt. R. H. Gillespie of the Oxford Elementary School, both in Oxford, Miss., for permission to use the subjects of this investigation; to Katharine Clark Hantz, who aided in the collection of data; and to the teachers and children who cooperated.

High School, both in Oxford, Mississippi, were tested in the course of this investigation. The study was begun in Grade 3, as the apparatus used was not suited to the testing of younger children. Grades 3, 6, 9, and 12 were selected because they represented, at equal intervals, the range of public school children mature enough for investigation.

Both a control and an experimental group were used in each grade throughout the study. These consisted of two numerically equal sections into which all grades in both schools were currently divided. The method of division into sections was alphabetical in the case of the elementary school and indiscriminate in the case of the high school. Since both methods should yield comparable divisions, the grades tested were not re-grouped by the experimenter. Chance selection determined the choice of a section as the experimental or control group. Reproof was provided only in the experimental group. The control group was used to determine the change in performance attributable to repetition of a task.

The control and experimental groups of each grade were retained as far as was possible for the two experiments of the study. It will be noted that during the investigation the number of subjects decreased in each experiment from Test 1 to Test 3. Holidays and illness caused the greater part of this loss. Some additions were made in Experiment II, but no subjects were added during the course of an experiment; if a subject missed the second test in a series he was dropped from the remainder of the experiment.

2. Tasks and Procedure

An arithmetic reasoning task and a motor task were used. Each one was presented three times. The procedures specific to the two tasks will be described in order.

a. Experiment I. Arithmetic Reasoning Task.

(1). *Test 1.* The Otis *Arithmetic Reasoning Test, Form A*, was administered in the morning to all sections of each grade in the absence of the teacher but in the regular classroom. In the elementary school the home-rooms of the grades were used. High school subjects were tested in their English classes, as this was the only

period during which intact groups were available. No comment was made by the experimenter beyond the instructions:

I have here an arithmetic test which I want you to take. I shall place the papers face down on your desks. You may begin filling in the information asked for on the back of the test blank, but *under no conditions* are you to turn the paper over before I tell you to start.

The papers were then distributed and after the back page had been filled the instructions were completed:

You will be given six minutes for this test. At the end of that time, I will tell you to stop working. Please stop when I tell you to. Your scores on this test will not count on your school grades. Are you ready? Begin.

At the end of six minutes the signal to stop was given and the papers were collected.

(2). *Test 2.* Two days later the same Otis Test was administered to all sections under the same general conditions as in Test 1. The control groups were instructed:

I am going to give you this arithmetic test again. The instructions about starting and stopping are the same as before—do not start until I tell you to, and stop when I tell you to. You have six minutes.

The papers were then distributed and the testing proceeded as in Test 1. The experimental groups were told:

Your scores on this arithmetic test last time were very bad. They were much worse than scores made by pupils of your grade elsewhere. I am going to give you the test again. Please see if you can't do better than you did last time. You certainly should improve. Remember that you have only six minutes for the test, so *hurry* in order that you may work more problems than you did last time. Do not start working until I tell you to.

Throughout the test the experimenter walked around the room, looking at the subjects' papers and commenting, "*You're working too slowly,*" "*Hurry up; you haven't much time left,*" and "*You're making a bad score this time.*" After each minute the remaining time was announced to the subjects and they were urged to hurry.

At the end of six minutes the signal to stop was given and the papers were collected.

(3). *Test 3.* Two weeks later the Otis *Test* was administered again to all sections. This was to determine the persisting effect of the reproof. The instructions to all groups were identical with those given the control group in Test 2. In all tests, scoring was in terms of the number of correct answers.

b. Experiment II. Motor Task. The task consisted in the rapid turning of a Miller Falls hand-drill No. 1, fitted with a Veeder Counter so that one revolution of the drill handle recorded four on the counter.² A board into which the drill fitted was clamped to a table which was adjusted to waist height for all subjects. The drill bit used was a blank. Performance was measured by the number of revolutions recorded on the counter in a 10-second interval. Subjects were tested in pairs, though only one child was allowed in the room at a time. While one subject was being tested, the companion remained outside so that scores given one could not be heard by the other. Three test-series of six 10-second trials each were made. The subjects alternated after each two 10-second periods to prevent fatigue. Half of the subjects from each group were tested in the morning and half in the afternoon, but the time of testing remained the same for each individual.

(1). *Test 1.* Both control and experimental sections were tested in the same manner. When a subject entered the room, he (she) was asked his (her) name and grade. The subject was then handed the drill and instructed:

I want you to hold this hand-drill in your left hand and turn it with your right hand. [Left handed subjects were permitted to reverse this technique.] Turn it just as fast as you possibly can, as I want to see how well you do in comparison with the rest of your class. Do not start until I say "*Start*," and be sure to stop when I say "*Stop*." I am going to say "*Ready*," and then I am going to say "*Start*." Now remember that you must not start until I tell you to, and that you must stop when I tell you to. Ready, start!

Two practice trials, the results of which were not recorded, pre-

²This test was adapted from one created by Dr. Walter R. Miles (9), who found the reliability of the test to be .38 for 15 10-second trials on each of two days.

ceded the test series. Testing followed. At the end of 10 seconds the command "Stop" was given and the number of revolutions on the Veeder counter was recorded. The subject was then told a score. After another 10-second trial a larger score was told, regardless of actual performance. Although the same scores were not told to all subjects, the ratio of increase was kept constant. The subjects were then alternated. This routine was performed three times, giving a total of six trials per individual.

(2). *Test 2.* Test 2 was made three weeks after Test 1. The control groups were tested in the same manner as in Test 1. These subjects were told:

I am going to test you again on the hand-drill. The instructions about starting and stopping are the same as before, except that I am not going to give you any practice periods. Remember not to start until I say "Start," and to stop when I say "Stop." Are you ready? Start.

These groups were given constantly increasing scores after each of the six test periods. The experimental groups were given the same instructions as the control groups, but after the first trial the experimenter announced:

Your score is — (189). Your last score last time was — (194), so you are not doing as well as you were. Practice should cause an improvement. Try again.

Following each of the remaining five trials, these subjects were told constantly decreasing scores. All subjects were again alternated after each two trials.

(3). *Test 3.* In Test 3, made two weeks after Test 2, both control and experimental subjects were given increasing scores after each trial. Instructions were given as in Test 2, control group.

C. RESULTS AND DISCUSSION

The data collected during each experiment will be analyzed separately under the following headings: (a) intra-group comparisons between successive test scores, to determine the effects of reproof and repetition in each group; (b) inter-group comparisons, to determine the initial comparability between control and experimental groups and the effects of reproof within each grade; (c) inter-grade comparisons, to determine the effects of reproof in relation to school age.

1. *Experiment I. Arithmetic Reasoning Task*

a. *Intra-group comparisons.* The scores made by each subject on the three administrations of the Otis Test were compared as follows within each group: Test 1 with Test 2, Test 2 with Test 3, Test 1 with Test 3. In the experimental group Test 1 was compared with Test 2 to determine the effect of reproof plus practice; Tests 1 and 2 were compared with Test 3 to determine the persistence of this effect. Comparisons between test scores within control groups were made to ascertain the effect of practice alone. The comparisons were in terms of the means of the score-differences and the standard deviations of the distributions of differences.

TABLE 1
SIGNIFICANCE OF DIFFERENCES WITHIN EXPERIMENTAL AND CONTROL GROUPS
BETWEEN TESTS 1-2, 2-3, 1-3 ON OTIS *Arithmetic Reasoning Test Form A*

Grade	Group	No. subjects	Tests	Mean of diffs.	σ	σ_m	M/σ_m
3	E	32	1-2	.16	1.37	.24	.67
		25	2-3	.20	1.33	.27	.74
		25	1-3	.36	1.44	.29	1.24
	C	32	1-2	.59	1.35	.24	2.46
		29	2-3	.17	1.54	.29	.59
		29	1-3	.38	1.61	.30	1.27
	E	26	1-2	1.42	1.98	.40	3.55
		26	2-3	1.00	2.37	.47	2.13
		26	1-3	2.42	1.84	.37	6.54
6	C	27	1-2	.44	1.37	.27	1.63
		25	2-3	.88	1.70	.35	2.51
		25	1-3	1.28	1.52	.31	4.13
	E	25	1-2	.80	2.02	.41	1.95
		24	2-3	.50	1.80	.38	1.32
		24	1-3	1.33	1.75	.36	3.69
	C	25	1-2	.40	1.36	.28	1.43
		25	2-3	.64	1.49	.30	2.13
		25	1-3	1.04	1.34	.27	3.85
9	E	29	1-2	1.14	1.81	.34	3.35
		25	2-3	.92	1.88	.38	2.42
		25	1-3	1.92	2.15	.44	4.36
	C	20	1-2	.90	2.07	.47	1.91
		16	2-3	.81	1.78	.46	1.76
		16	1-3	1.88	1.89	.49	3.84
	E	29	1-2	1.14	1.81	.34	3.35
		25	2-3	.92	1.88	.38	2.42
		25	1-3	1.92	2.15	.44	4.36
12	E	29	1-2	1.14	1.81	.34	3.35
		25	2-3	.92	1.88	.38	2.42
		25	1-3	1.92	2.15	.44	4.36
	C	20	1-2	.90	2.07	.47	1.91
		16	2-3	.81	1.78	.46	1.76
		16	1-3	1.88	1.89	.49	3.84
	E	29	1-2	1.14	1.81	.34	3.35
		25	2-3	.92	1.88	.38	2.42
		25	1-3	1.92	2.15	.44	4.36

Critical ratios were calculated to ascertain whether these test differences were significant. The results are given in Table 1.

The comparisons show that all groups improved in performance from Tests 1 to 2, and 2 to 3. It may be seen that the improvement was statistically significant in many cases. The improvement was least, however, in Grade 3, the youngest groups.

b. Inter-group comparisons. Before the effects of reproof in Experiment I could be determined within each grade by comparing the scores of the control and experimental groups, it was necessary to determine the initial comparability in performance of these groups on the Otis Test. The mean, standard deviation, and standard error of the mean of the distribution of the scores made by each group on Test 1 were computed. The differences here were negligible except in Grade 9, where the control group was significantly superior (D/σ_D of 4.0) to the experimental group.

Comparison of improvement by experimental and control groups within each grade was made by subtracting the means of the test score differences for the control groups from those of the experimental groups (data taken from Table 1). According to these calculations given in Table 2, no statistically significant differences were found between the control and experimental groups in any grade. All

TABLE 2
SIGNIFICANCE OF DIFFERENCES BETWEEN EXPERIMENTAL AND CONTROL GROUPS
IN TEST DIFFERENCES 1-2, 2-3, 1-3 ON OTIS *Arithmetic Reasoning*
Test Form A

Grade	Test	D^*	σ_D	D/σ_D
3	1-2	-.43	.34	-1.27
	2-3	.03	.40	.08
	1-3	-.02	.42	-.05
6	1-2	.98	.47	2.04
	2-3	.12	.59	.20
	1-3	1.14	.47	2.41
9	1-2	.40	.50	.81
	2-3	-.14	.47	-.30
	1-3	.29	.47	.62
12	1-2	.24	.57	.42
	2-3	.11	.60	.18
	1-3	.04	.65	.06

*Experimental minus Control.

differences are in the direction of greater improvement for the experimental group, with the exception of test differences 1-2 and 1-3 in Grade 3 and 2-3 in Grade 9. It is clear that the reproof did not improve performance of the third grade subjects.

Since some studies (7, 8) have reported failure to improve in score under reproof and time limit due to increase in errors and items attempted, this possibility was investigated in the Otis *Test* data. Correlations were computed on each test between score and number of items attempted (Table 3). If reproof were accompanied

TABLE 3
CORRELATIONS BETWEEN SCORES ON OTIS *Arithmetic Reasoning Test Form A*
AND ITEMS ATTEMPTED

Grade	Group	Test 1		Test 2		Test 3	
		<i>r</i>	<i>PE</i>	<i>r</i>	<i>PE</i>	<i>r</i>	<i>PE</i>
3	<i>E</i>	.01	.11	.03	.12	.13	.13
	<i>C</i>	.12	.12	-.03	.12	.02	.13
6	<i>E</i>	.42	.11	.33	.12	.13	.13
	<i>C</i>	.43	.11	.01	.13	.56*	.09
9	<i>E</i>	.32	.13	.36	.12	.29	.13
	<i>C</i>	.60*	.08	.57*	.09	.41	.11
12	<i>E</i>	.67*	.06	.50*	.09	.55*	.09
	<i>C</i>	.75*	.06	.75*	.07	.53*	.12

*Correlation is 4 x *PE*.

by an increase in errors and items attempted, significant negative correlations should occur in experimental groups and significant positive correlations in control groups.

All correlations in Grade 3 were very low and insignificant. Only one was negative.

In Grade 6 all correlations were positive; only one, for Test 3, control group, was significant. It has been shown that between Tests 1 and 3 both the control and experimental groups of Grade 6 improved but that the difference between them, in the direction of the experimental group, approached significance. This suggests that, in the experimental group, reproof caused both an increase in score over that attributable to practice, and an increase in items attempted.

In Grade 9 all correlations were positive, the only significant ones occurring for Tests 1 and 2, control group. Since the control group was initially superior to the experimental, these correlations cannot be emphasized.

All correlations in Grade 12 were positive and significant. These correlations, as well as those in Grade 3, might have been produced by the nature of the Otis *Arithmetic Reasoning Test, Form A*. Though the test is constructed for use with children eight years of age and older, subjects in Grade 3 seemed unaware of the increasing difficulty of the problems, often remarking when their papers were collected, "*I got all mine,*" or "*I worked all of them.*" Conversely, members of the twelfth grade frequently completed all 20 problems correctly before the six minutes of the testing period had elapsed. This also occurred a few times in Grade 9.

There seems to be no reason to believe that reproof impaired performance by increasing the number of errors due to more items attempted.

c. *Inter-grade comparisons.* Inter-grade comparisons (see Table 2) of the effects of reproof on the arithmetic reasoning task show that: in Grade 3 reproof impaired considerably the scores of the experimental subjects, but the effect was not very persistent; in Grade 6 reproof produced improvement in score, and this effect persisted; in Grades 9 and 12 reproof improved performance, but the effect was negligible.

2. Experiment II. Motor Task

a. *Intra-group comparisons.* When inter-test comparisons were made within each group, the differences tabulated in Table 4 were found.

In Grade 3, both groups improved significantly in performance between Tests 1 and 2 and 1 and 3.

In Grade 6, both groups improved in performance between Tests 1-2 and 1-3; in the experimental group these differences are significant; in the control group, these differences approached significance.

No significant differences are evident in the ninth grade. Both groups improved in performance between Tests 1 and 2 and declined in performance between Tests 2 and 3.

In both the control and experimental groups of Grade 12, no test differences approached significance. Improvement is indicated in all cases from Test 1 to Test 2, but does not appear in Test 3.

b. *Inter-group comparisons.* The comparability of the control

TABLE 4
SIGNIFICANCE OF DIFFERENCES WITHIN EXPERIMENTAL AND CONTROL GROUPS
BETWEEN TESTS 1-2, 2-3, 1-3 ON HAND-DRILL

Grade	Group	No. subjects	Tests	Mean of diffa.	σ	σ_m	M/σ_m
3	E	35	1-2	13.11	9.37	1.56	8.40
		31	2-3	.39	7.33	1.31	.30
		31	1-3	13.26	12.55	2.24	5.92
	C	32	1-2	9.34	8.88	1.57	5.95
		29	2-3	2.55	8.67	1.64	1.55
		29	1-3	11.79	9.10	1.72	6.85
	E	28	1-2	9.00	9.71	1.87	4.81
		27	2-3	2.15	9.00	1.76	1.22
		27	1-3	11.33	10.69	2.10	5.40
6	C	27	1-2	4.44	7.64	1.50	2.96
		25	2-3	— .20*	8.58	1.75	— .11
		25	1-3	4.28	8.24	1.68	2.55
	E	38	1-2	2.29	10.20	1.65	1.39
		25	2-3	— 8.62*	17.35	3.54	— 2.44
		25	1-3	— 5.38*	20.94	4.27	— 1.26
	C	37	1-2	5.22	12.21	2.01	2.60
		24	2-3	— 1.33*	10.80	2.25	— .59
		24	1-3	4.00	13.03	2.71	1.48
12	E	33	1-2	2.70	13.22	2.30	1.17
		24	2-3	— 5.50*	17.15	3.57	— 1.54
		24	1-3	— 4.42*	24.71	5.15	— .86
	C	29	1-2	2.24	12.88	2.43	.92
		19	2-3	.11	12.98	3.09	.04
		19	1-3	.26	15.11	3.60	.07

*Difference is in direction of earlier test.

and experimental groups on Test 1 was determined for each grade. No appreciable difference occurred.

Comparisons within each grade of the improvement from test to test of the control and experimental groups (Table 5) show the experimental groups of Grades 3 and 6 improving slightly more than the control groups. In Grades 9 and 12 the control groups improved by comparison with the decrement in performance of the experimental groups.

c. *Inter-grade comparisons.* Comparison of grades to determine how the effect of reproof on a motor task changes with age shows that: in Grades 3 and 6 reproof improved performance and this

TABLE 5
SIGNIFICANCE OF DIFFERENCES BETWEEN EXPERIMENTAL AND CONTROL GROUPS
IN TESTS DIFFERENCES 1-2, 2-3, 1-3 ON HAND-DRILL

Grade	Test	D^*	σ_D	D/σ_D
3	1-2	3.77	2.21	1.70
	2-3	-2.16	2.10	-1.03
	1-3	1.47	2.82	.52
6	1-2	4.56	2.40	1.90
	2-3	2.35	2.48	.95
	1-3	7.05	2.69	2.62
9	1-2	-2.93	2.60	-1.13
	2-3	-7.29	4.19	-1.74
	1-3	-9.38	5.06	-1.85
12	1-2	.46	3.35	.14
	2-3	-5.61	4.72	-1.19
	1-3	-4.68	6.28	-.75

*Experimental minus Control.

effect persisted slightly; in Grade 9 reproof caused no significant changes, though the experimental group declined slightly in performance between Tests 1 and 3; in Grade 12 neither reproof nor practice had appreciable effect.

D. SUMMARY AND CONCLUSIONS

The object of the present study was to determine the effect of reproof upon subjects of varying school ages. Two hundred and thirty-four children in Grades 3, 6, 9, and 12 were reproofed and the effect measured. Verbal reproof was provided by the experimenter, and an arithmetic reasoning task (Experiment I) and a motor task (Experiment II) were used to measure its effects. A control and an experimental group were used in each grade throughout the investigation. Reproof was provided only in the experimental groups. The control groups were retained to determine the change in performance attributable to repetition of a test.

The data collected indicate that:

In Experiment I, in each grade: (a) intra-group comparisons show that both groups improved in score during the course of the experiment; (b) inter-group comparisons show that, with the exception of Grade 3, the experimental group improved in score during the course of the experiment more than did the control group;

(c) inter-grade comparisons show that reproof impaired performance in Grade 3, improved performance in Grade 6, and had slight effect in Grades 9 and 12.

In Experiment II, in each grade: (a) intra-group comparisons show that both groups improved in score and that the effect persisted in Grades 3 and 6; (b) inter-group comparisons show that in Grades 3 and 6 the experimental group improved more than did the control group, in Grade 9 the control group exceeded the experimental, and in Grade 12 there was no appreciable change; (c) inter-grade comparisons show that reproof improved performance in Grades 3 and 6, impaired it slightly in Grade 9, and produced slight change in Grade 12.

This study disclosed that, at about age 9, reproof impaired performance on an arithmetic task and improved it on a motor task; at about age 12 reproof improved performance on both tasks; at about ages 15 and 18, reproof had little effect on performance of either task.

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WISHES OF 109 WOMEN PRISONERS*

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The study here reported¹ affords further comparisons with data published by Jersild regarding wishes of children (1) and by Wilson (3, 4) regarding wishes of 129 women students and 103 elderly persons.

A. SUBJECTS

The subjects of this study were 109 women prisoners, guilty, either by plea or verdict, of a crime which brought them before the Superior Courts of Los Angeles County during the years 1938-1940. All had applied for probation and were interviewed during the period of incarceration after plea or verdict of guilty and before date of hearing on probation and sentence.

Their ages ranged from 18 to 53, with a median age of 28. Ages were distributed as in Table 1.

TABLE 1

Age Range	Number ^a
16 - 20	11
21 - 25	25
26 - 30	27
31 - 35	16
36 - 40	10
41 - 45	11
46 - 50	5
51 - 55	3
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In nationality the group was composed of 75 "American," 8 Negro, 7 Mexican, 7 Canadian or English, 6 Jewish, 4 European, 1 Indian.

Alleged years of education ranged from 1 to 14, with a median

*Received in the Editorial Office on February 24, 1942.

¹Conducted at Los Angeles County Probation Department.

^aNo identification appeared on one paper, and age, nationality, marital status, crime, etc., could not be determined.

of 10 years. In most cases no effort was made to verify the report of amount of schooling.

Only 16 of the group, or 15 per cent, were single. The rest had all been married, though their present marital status was often ambiguous.

The distribution of their crimes is given in Table 2.

TABLE 2

Crime	Number
Forgery	23
Contributing to delinquency of minor	22
Checks without sufficient funds	18
Grand theft	9
Violation of State Narcotic Act	7
Burglary	5
Robbery	5
Petty theft	3
Receiving stolen property	2
Assault	4
Drunk	4
Disturbing the peace	1
Violation of vehicle code	1
Perjury	1
Bigamy	1
Performing abortions	1
Selling mortgaged property	1
	<hr/> 108

B. METHOD

At the conclusion of a long interview followed by a psychological test, each woman was given a piece of paper with the request: "*Will you write down what would be your first three wishes if you were told that you could have anything you wanted?*"

There were great differences in the spontaneity of their performance, in the amount of thought underlying the wishes, and almost certainly in the levels of desire sampled. Some women had their wishes "on the tip of their tongues"; others spent a long time chewing the pencil and considering the problem.

C. RESULTS

Jersild, Markey, and Jersild (1) classified the wishes of their children into 21 categories with 45 sub-classifications, and Wilson (3, 4)

followed this same general plan of presentation in his later studies, adding one additional category, *xxii, Special future benefits for self*, in the case of his elderly groups. This category has here been changed to "*Special immediate benefits for self*," and in it have been classified such wishes as arise out of the special situation of these women. The operation of classifying the wishes is not without difficulties, as the previous authors have observed. But because their results have been of interest, the same classificatory scheme was followed here for purposes of comparison. Table 3 shows the 327 wishes in the present study thus classified.

TABLE 3
327 WISHES OF WOMEN PRISONERS
Grouped according to Jersild's Subclassifications.

	No.	Per cent
I. <i>Specific material objects and possessions</i>		
1. toys	0	
2. clothes	1	
3. food, eating, etc.	1	
4. vehicles, automobiles	1	
5. pets	0	
6. furniture (piano, "nice things")	2	
Total	5	2
II. <i>Money</i>		
7. money	8	
8. wealth		
debts paid, home paid for	2	
financial success	1	
Total	11	3
III. <i>Good living quarters</i>		
9. comfortable home	1	
Total	1	0
IV. <i>Activities, sports, diversions</i>		
10. reading	0	
11. sports	0	
12. movies	0	
13. country and camp: vacation	0	
14. travel	3	
15. occasions — attend fashion show	1	
16. parties	0	
17. tasks and undertakings	0	
Total	4	1

TABLE 3 (Continued)

	No.	Per cent
<i>V. Opportunities and accomplishments</i>		
18. specific education	3	
beauty school	1	
business course	2	
more thorough education		
19. music	1	
course in music and vocal		
20. personal accomplishments	1	
my own place in society	0	
21. advancement, promotion in school		
Total	8	2
<i>VI. To be independent, have a vocation</i>		
22. profession, business	13	
a good job	4	
get work	2	
a position	1	
a good position with a good salary	1	
occupational opportunity	1	
make a living for my child	1	
success	2	
interesting work	1	
continue work	1	
x my life had been more successful pro-		
fessionally	1	
a place of business of our own	1	
successful writer	1	
moderate renown in literature	1	
continue art work	1	
do housework	1	
earn living by singing	1	
success in world of entertainment	1	
success in business career	1	
x get back into government service	1	
x that I was a nurse	1	
23. Be big, independent	5	
financial independence	1	
earn own livelihood	1	
economic security	1	
Total	44	14
<i>VII. To be bright, smart</i>		
24. be bright, smart	0	0
<i>VIII. Moral self improvement</i>		
25. moral improvement	3	
x never tempted to do wrong again	3	
stop drinking for good		
continue on outside as law-abiding citizen	2	

TABLE 3 (Continued)

	No.	Per cent
be a good mother	2	
be good	1	
keep away from trouble	1	
make folks proud of me	2	
make this up to my family	2	
x erase all my wrong-doings from hearts of parents	2	
x that we had never gotten into this trouble	3	
x had never met Mr. S. (co-defendant)	1	
x to find I dream and never had committed a forgery	1	
make amends for crime	4	
chance to start anew	1	
know more about God	1	
know more about spiritual things with the hope it might help me to control bad impulses	1	
Total	30	9
IX. <i>Improved personal appearance</i>		
26. have nice face		
have perfect teeth	1	0
X. <i>Prestige, adventure</i>		
27. personal prestige		
respect, confidence from others	2	
reestablish myself to others	1	
that people would know me just as I am	1	
28. adventure	0	
Total	4	1
XI. <i>Supernatural power</i>		
29. have magic powers	0	0
XII. <i>Have (or keep) baby (or children), sibling</i>		
30. Have a baby		
children (or my child)	12	
my baby, baby	4	
keep baby	2	
Total	18	6
XIII. <i>Be married, have a lover</i>		
31. get married	2	
own home	19	
nice home	5	
marry and have children	2	
home and children	2	
nice family	3	
nice husband and settle down	1	

TABLE 3 (Continued)

	No.	Per cent
husband	3	
good husband	2	
happy marriage	1	
happy home life with congenial loving husband	4	
32. to love and be loved	3	
keep love of husband	1	
go back to husband	1	
x my husband (lost in war)	1	
Total	49	15
XIV. 33. <i>parents never die</i>	0	0
XV. <i>Companionship</i>		
34. companionship		
be near (or with) son (husband, children, etc.)	13	
Paul, baby and I together	1	
companionship of family or husband	1	
35. friends		
own friends	1	
good friend	1	
friendships	1	
lasting friendships	1	
Total	19	6
XVI. <i>Relief from irritations</i>		
36. relief from duties	0	
37. relief from physical pain	0	0
XVII. <i>Specific benefits for parents and relatives</i>		
39. benefits		
good job for husband	5	
baby legally have name	1	
baby born out of prison	1	
put my boy through school	1	
raise my three boys and give them good education	1	
get myself and children back to Michigan	1	
be financially able to send nieces to college	1	
have mother (or both parents) live in California in comfort	3	
good job for brother	1	
mother to see baby	1	
40. releases		
husband released	1	
get my girl and boy out of Juvenile Hall	2	
mother to have security and be free from worry rest of life	1	
x mother had her health	1	

TABLE 3 (Continued)

	No.	Per cent
x sister had operation over with successfully	1	
foster parents had their money and were		
happy again	1	
Total	23	7
XVIII. <i>General inclusive benefits for self</i>		
41. general benefits		
good catholic religion	1	
get along with everyone	1	
42. health, happiness, etc.		
good health	13	
be well of my health	1	
x cured of syphilis right now	1	
healthy and strong	1	
happiness	10	
happiness and contentment in home	1	
live very happy	1	
peace of mind	4	
rest	1	
love	1	
Total	36	11
XIX. <i>General immunities for self</i>		
43. remove all obstacles		
divorce from present husband	1	
44. never be poor	0	
Total	1	0
XX. <i>General benefits for relatives</i>		
45. good health for parents	2	
healthy minds and bodies for children	2	
make life happier for mother (dad, or		
daughter)	3	
able to help brother (or mother)	2	
able to help my sick ones	1	
children happy	3	
success for son	1	
have mother and baby fine	1	
x have things in family as they were a year ago	1	
Total	16	5
XXI. <i>General benefits for others (philanthropic)</i>		
46. release from bad people	0	
47. general benefits for others		
help the unfortunate women who file in and		
out of this jail	1	
help others to happiness	1	
treat fellow man as I'd wish to be treated	1	

TABLE 3 (Continued)

	No.	Percent
48. philanthropy	0	
49. improvement in socio-economic conditions	0	
Total	3	1
XXII. <i>Special immediate benefits for self</i>		
freedom, out of jail	21	
go home (to husband, mother, child, etc.)	13	
probation	9	
out of this trouble	1	
out of this town as fast as I can	1	
return to Washington	1	
remain in Los Angeles	2	
husband and I receive same punishment	1	
to hear from husband	1	
as little publicity over this as possible	1	
x that none of my friends knew about this	1	
x have my finger prints erased from the records	1	
to make restitution	1	
Total	54	17
		100

Particular difficulty was experienced in classification of those wishes included under "moral self improvement," which could in some instances be thought of also as "general benefits for self." It is further possible that such wishes as those for "freedom" and to be "out of jail" should be grouped under "relief from irritation." The present classification is necessarily arbitrary, but effort has been made to follow the general patterns laid down by Jersild and Wilson.

Table 4 shows a grouping of classifications for comparison with findings of Jersild and Wilson for elderly persons, women students, children 11-12, and children 5-6.

Certain comparisons with findings in the other groups deserve comment.

1. Most striking is the small proportion of wishes for specific objects and material possessions. The tendency toward such wishes is very strong in children and stronger in all other groups than in these women.³ The proportion expressing a desire for money is as

³ $\frac{\sigma_{diff}}{\sigma_{diff}} = 6$ when compared with college women.

TABLE 4
CONDENSED COMPARISON OF GROUPS BY PERCENTAGES

Number	Pay. 48	Elderly Char. 55	Total 103	Women students 129	Children 11-12 100	5-6 100	Women criminals 109
Specific objects, possessions, activities (I, III, IV)	19	19	19	15	27	62	3
Money, wealth (II)	3	19	11	15	6	5	3
Opportunities, accomplish- ments, improvements (V, VII, VIII, IX, X, XI)	3	3	3	12	8	5	12
Vocation (VI)	0	2	1	17	6	4	14
Companionship, relatives, friends (XII, XIV, XV)	9	12	11	7	15	8	12
Marriage (XIII)	1	4	3	9	2	1	15
Benefits for self (XVI, XVIII, XIX)	19	23	24	11	7	5	11
Specific benefits, self (XXII)	28	1	13	0	0	0	17
Benefits for relatives (XVII, XX)	8	10	9	6	15	3	12
Philanthropic, etc. (XXI)	10	2	6	8	13	5	1
Total	100	100	100	100	99	98	100

low.⁴ That these women needed money badly is indicated by the fact that 60 per cent of them were incarcerated for crimes against property (forgery, checks without funds, etc.). Furthermore, they were at this time in a situation where money for lawyers' fees, restitution, etc., was urgent. This is, therefore, a surprising finding, which in all probability reflects the irresponsibility and lack of realism in their attitudes toward money and possessions which played an important part in their offenses in the first place. Their attempts to get money were impulsive, unconsidered acts, stemming from momentary urges. Many of the forgers, for example, were intelligent

$\frac{s_{diff}}{\sigma_{diff}} = 6$ when compared with college women.

women, who if guided by reasonable and responsible attitudes toward money need not have resorted to forgery. Yet some of them wrote checks over long periods of time, never actually facing their problem on an adult and responsible basis. Findings in an earlier study also suggested a similar desire to escape responsibilities associated with money and wealth. Almost 9/10 of a group of male criminals, also in large part convicted of crimes against property, expressed actual *dislike* for the idea of being "one of the richest men in the United States," many of them observing, "That would be too much trouble" (2).

2. The largest proportion of these women's wishes fell in the category of "special immediate benefits for self," a category added to Jersild's original list in order to describe those desires arising out of the particular predicament of these incarcerated women. It is natural that before all else many of them wanted "freedom," to be "out of this jail" or this town, to go home, or to be granted probation. This category of wishes affords no comparison with wishes of college women, since no such class of wishes was there included; but the elderly groups, especially the paying group, confronted by the approaching end of their lives, made similarly a large proportion of special wishes (28 per cent) dealing with their future. Especially frequent among their *first* wishes were "an easy death," "to die soon," and the like.

3. When *first* wishes only were examined, the proportion mentioning *money* or "financial success" remained low (2 per cent) and none wished for specific material objects or possessions. But the number of wishes for special immediate benefits for self rose sharply,

from 17 to 31 per cent. ($\frac{diff}{\sigma\ diff} = \text{more than } 2.86$ since some cor-

relation would exist between first wishes and all wishes). To be free, to be out of jail, to go home, seemed with many to be prerequisite for all other wishing. Again it is not surprising that if they were limited to one wish only, they would use that wish to escape from jail or from their immediate difficulty. Table 5 shows a comparison between first wishes and all three wishes.

4. Next to these pressing immediate desires for freedom among these women, ranked the wish for home or husband. It is natural

TABLE 5
COMPARISON BETWEEN FIRST WISHES AND ALL WISHES
109 WOMEN PRISONERS

	Per cent first wishes	Per cent all wishes
I. Specific material objects and possessions	0	2
II. Money	2	3
III. Good living quarters	1	0
IV. Activities, sports, diversions	0	1
V. Opportunities and accomplishments	4	2
VI. To be independent, have a vocation	9	14
VII. To be bright, smart	0	0
VIII. Moral self improvement	6	9
IX. Improved personal appearance	0	0
X. Prestige, adventure	1	1
XI. Supernatural power	0	0
XII. Have baby	3	6
XIII. Marriage, home	17	15
XIV. Parents never die	0	0
XV. Companionship	5	6
XVI. Relief from irritations	0	0
XVII. Specific benefits for relatives	6	7
XVIII. General benefits for self	9	11
XIX. General immunities for self	0	0
XX. General benefits for relatives	6	5
XXI. Philanthropic, etc.	0	1
XXII. Special immediate relief for self	31	17
Total per cent	100	100

that this wish should have much higher frequency among them than among the elderly groups or the children. But it is also somewhat (though not quite reliably) higher than among the college women.⁵ College women may be less candid and more conventional about expressing this desire, and they also wish more often for vocational success rather than for marriage. But among these women prisoners, disturbance in conscious emotional adjustment was apparent in many, and in cases of "contributing to the delinquency of a minor" the offense itself often expressed the pressure of their need for satisfactory emotional and sexual relationships, even when they were not free to marry. The wish for home or husband occurred with the same frequency among both the married and single women of the group.

⁵ $\frac{diff}{\sigma diff} = 2.5$ when compared with college women.

This wish and those for immediate self-benefits already noted, had even higher incidence among *first* wishes.

5. In proportion of wishes for benefits for relatives, they are closer to the 11-12-year-old children than to college women. But general, abstract philanthropic wishes are conspicuously low among them, even the younger group of children surpassing them in this kind of social conscience.⁶ Jersild (1) notes an increase with age in wishes of a more general or inclusive nature. In this respect these women are clearly regressive. No general concern for improvement in socioeconomic conditions, for peace, or for equality was expressed, and only one wish for the "happiness of others." The other two of the three wishes in this category were prompted by and closely related to their own situation; for example, "*To help the unfortunate women who file in and out of this jail.*" This lack of any broad social consciousness may well have played a part in their willingness to perform anti-social acts. On the other hand, the failure of such wishes to come to expression at this time could be symptomatic of their preoccupation with their own immediate problems.

6. Jersild (1) and Wilson (3, 4) note that among all the groups they studied, "thoughts (as revealed by wishes) are directed more toward accomplished objective facts than toward the possession of powers within themselves which would enable them to win the things they desire." Among these women, too, wishes for accomplished facts predominate. But the fact that they have been sharply jolted by arrest and imprisonment has caused them to turn their thoughts a little more, at least for the moment, toward improvement of these inner powers. Their deficiency has brought disaster. Now rather than 0 per cent as among the groups of children and elderly people, or 2 per cent as among college women, 9 per cent⁷ of these women offenders wished that they might "never be tempted to do wrong again," might "stop drinking for good," and the like. In times of stress people turn to religion. So do the wishes of these women

⁶ $\frac{diff}{\sigma diff} = 4.6$ when compared with college women.

⁷ $\frac{diff}{\sigma diff} = 4.1$ when compared with college women.

turn toward self-improvement. But they wish these greater inner resources for personal, not social, ends. They want to "keep out of trouble," not to insure any improvement in the social order.

7. "Impossible wishes." The situation in which these women were at the time of interview makes almost impossible an evaluation of their wishes as to probability of fulfillment, as Jersild and Wilson have attempted. It would require clairvoyance to predict whether they will get "nice homes" and "congenial husbands," "beauty courses" or "financial independence." Even more difficult is it to say whether they will be able to "stop drinking for good," to "keep out of trouble," or to be "good mothers." At this time one would tend to label many of these wishes unlikely of attainment, but this might be an unjustifiably sombre prophecy. The attempt was made, therefore, to select only the wishes which are *certainly* impossible of fulfillment, such as "have my finger prints erased from the records" or "to find that I dream and never had committed a forgery." In Table 3, x appears before such items. These clearly impossible wishes constituted 5 per cent of the total, a proportion which differs little from that of "impossible" wishes among the group of college women.

D. SUMMARY

A collection of wishes expressed by 109 women prisoners was analyzed according to Jersild's classificatory scheme and compared with wishes of children, of two groups of elderly persons, and in particular, with those of 129 college women previously reported.

1. In spite of the fact that 60 per cent of these women were incarcerated for crimes against property, wishes for money or for material possessions occurred rarely, significantly less often among them than among college women. Lack of realism in their attitudes toward money is suggested.

2. The largest proportion of their wishes was directed toward escape from their immediate trouble, and among their *first* wishes the proportion of such desires was even higher.

3. Expressed desires for a husband or home were more frequent than among college women, though only 15 per cent of the group had never married. A home seemed to typify for them the emotional security in which many were seriously lacking. College women, on the

other hand, expressed more wishes for a career or for vocational success.

4. Philanthropic wishes or generalized desires for improved social or economic conditions were strikingly low among them, though there were many wishes for specific benefits for one relative or another.

5. Wishes for moral self improvement were much more common among them than among college women, no doubt growing out of the critical failure in ego functioning which brought them into the present difficulty.

6. In general, the wishes of these women prisoners tend to present a picture of individuals desiring most of all to be free and out of trouble, to have happy marriages, good husbands, nice homes, babies, to be able to cope with disturbing impulses in the future. Wishes for material possessions or for social betterment play little part in their thinking.

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VARIANT BEHAVIOR AS REVEALED BY THE GESELL DEVELOPMENTAL EXAMINATION*

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A. HISTORICAL

In a standardized developmental examination, the responses of a child may be adjudged as "right" or "wrong" on a strictly normative basis. There are, however, many interesting behaviors which are not specifically right or wrong. Such behaviors, here called *variant behaviors*, are considered as an integral and significant part of the child's whole response rather than as apart from or detracting from a satisfactory scoreable response. These behaviors are classified into groups to determine at what ages they most characteristically occur.

Relatively little has been written about such variant behaviors. An outstanding discussion, by Levy and Tulchin (6, 7) considers specifically *resistance behavior* observed during mental tests in children from 6 to 60 months of age—983 infants were observed. It was found that "the age resistance patterns follow an evolution from the simplest type of resistance, simple crying at the sixth month, to the use of words and complex movements, as in passive resistance, that continue to the end of the series at the 54th month." Crying, the most frequent resistance reaction in the first year gradually diminished in frequency with increasing age to fifth place at 36 to 47 months. Speech gradually reached first place in frequency. The peaks for resistance behavior occurred at 30 to 35 months and at 18 months. This study, though reflecting a developmental point of view, considers only those behaviors which express definite *resistance* to the test situations.

Several studies (Stutsman, Nelson, Rust) consider the *effect of resistance behavior on intelligence test scores*. The most detailed of these is Rust's book, *The Effect of Resistance on Intelligence Test Scores of Young Children*. Her subjects were 100 three-year-olds

*Accepted for publication by Arnold Gesell of the Editorial Board, and received in the Editorial Office on March 15, 1942.

who were tested on both the Merrill-Palmer and the Kuhlmann-Binet scales. Resistance was defined as any form of behavior other than attempting a test within 30 seconds after it was presented. Its effect on test scores was measured by scoring all tests initially refused as failed, and estimating the increase in mental age months and intelligence quotient points from initial and subsequent refusals to acceptance for the individual children resisting one or more tests.

It was found that 84 children were resistant to one or more tests on initial presentation. In general, the tests most frequently refused were those which involved a verbal response only, particularly mere repetition of numbers and sentences. Rust concluded that the variation in intelligence quotients on retests of young children is decidedly greater than has been found to exist with older children. Since all subjects were of one age group, the study does not reflect a developmental point of view. Nor does it consider the resistant behavior as in itself giving an indication of the age level at which any individual child is performing.

Goodenough (4) has considered the *emotional behavior* of young children during mental tests. Her data were derived from a total of 1,897 examinations of 990 children between the ages of 18 months and 6 years. Kuhlmann-Binet and Minnesota Preschool tests were used. Each child's behavior was rated with regard to three traits: shyness, negativism, and distractibility—there being five categories for each trait running from the least amount of the trait to the most. A decided "improvement" in behavior with increasing age was found for each trait. In the case of boys this improvement did not begin until about the age of 30 months, whereas girls showed a steady improvement from 18 months on.

B. PROBLEM, SUBJECTS AND PROCEDURE

1. Problem

Clinical judgment assumes a certain kind and degree of adaptive behavior to be appropriate to the individual tests of a developmental examination. By premise, we recognize that this normative behavior cannot be indefinitely maintained. It gives way, whether because of the difficulty of the task set or for some other reason, to other kinds and degrees of behavior which cannot always be appraised but which can be identified on a more or less objective basis.

These deviating behaviors as a class we shall call *variant behavior*.

The present study attempts to classify such behaviors into groups or types, and to determine whether or not they are similar enough from child to child to make possible the determination of developmental changes characteristic of the different preschool age levels.

The emphasis is on the different kinds of variant behavior as such, rather than on their effect on developmental test scores. The concept of resistance is thus replaced by the concept of variant behavior. It seems possible that a child's way of refusing or failing a test may give as concrete an indication of the age level at which he is responding as his manner of performing an accepted task. That is, a child's refusals and other variant behaviors are here considered *not as apart from or detracting from* more satisfactory and positive responses, *but as an integral and significant part* of the whole response. If an 18-months old child walks to the examining room and seats himself in a chair, we do not need the more formal evidence of set tests to tell us that he can walk and seat himself. Similarly, a 30-months old child who responds to verbal situations with no further word than "No" is indicating in that respect a 30-months verbal refusal response. We should not ignore this when we rate his language ability. Other variant behaviors may be used in the same manner to help us determine a child's developmental status. We ignore valuable clues if we consider only a child's positive, "successful" responses plus only those "failures" which directly involve an effort to perform in the requested manner.

(This does not mean that no effort was made to overcome initial refusals. A reasonable effort was made to obtain a positive response to each examination situation. Moreover, it is recognized that the amount of variant behavior observable depends to some extent on the manner in which an examination is conducted. In a normative research examination an Examiner may allow a child to exhibit considerable variant behavior, though never enough to endanger his continued adjustment to the examination. In the case of a handicapped or defective child, on the other hand, an effort is made to keep behavior to the point and as successful as possible in order to determine the child's abilities under the most favorable circumstances.)

2. Subjects and Procedure

Fifty subjects at each of the following monthly age levels (18-21, 24, 30, 36, 42, 48 and 60 months) or 350 subjects in all, were given the Gesell Developmental Examination¹ under standardized conditions. The mother was present during the examination usually till the child was 48 months old, and later if necessary. Tests above the child's age level were as a rule presented only if easier tests had already been met successfully. All tests were given by one of two examiners (*LBA* or *FLI*). In some instances the same subject was used at each of the seven age levels, and for other subjects from one to six examinations were available. Subjects ranged in intelligence from average to very superior. For the most part, behaviors of children of the several intelligence ranges were not treated separately. Both boys and girls were used.

Detailed stenographic recordings (made with the recorder behind a one-way-vision screen) were available for all examinations, as well as the examiner's own notes on variant behavior. Although the best obtainable stenographic recording was available, inevitably some minor details, as shuffling of feet, small mouth movements, etc., were occasionally omitted from the records.

After preliminary inspection of the data, six separate categories of variant behavior were distinguished. The first five of these lent themselves to an extremely objective treatment. With regard to the sixth category there was more individual variation from case to case, and this category was treated separately.

The six categories were defined as follows:

1. *Out-of-field behavior, motor.* Due to momentary exhaustion or dissolution of motor set or other inability to meet the situation. The behavior is out of phase and character.
2. *Out-of-field behavior, verbal.* Same as (1) except that the child's response is of a verbal instead of motor character.
3. *Reverted behavior.* The behavior begins at one level but reverts to a lower level. It remains in character, specific to the situation, child responding to the stimulus object or question.
4. *Perseverative behavior.* Child repeats some one response over and over in a stereotyped and inappropriate manner.
5. *Emotionally tangential behavior.* Behavior suggestive of mood swings, impulsive or recollected emotions, anxieties.

¹ For a description of all tests referred to hereafter by name see (1).

6. *Exploitive or original behavior.* Behavior which is exploratory and elaborative. It embellishes and diversifies. May denote initiative, productive innovation or creative tendencies.

All behavior examination records were then analyzed by the simple expedient of listing, at each age level, all different responses which came under each of the first five headings. (Clinical judgment was used to determine under which heading a behavior fell.) Each *new* response was added to the list, and ones already seen in other subjects were merely checked after the already listed items. A check was made for each time a child exhibited a behavior. Thus if four block-throwing episodes occurred during one examination, they would receive four, not one, check marks.

Special treatment accorded responses which fell in the third category (reverted behavior) will be discussed in more detail later (p. 294).

This analysis resulted in a numerical evaluation of all variant behavior observed in the analyzed examinations. It indicates how many times each different behavior was seen at each age. A few responses were found in each category at each age level which were unique for individual subjects or which occurred only a few times among the whole group, but for the most part there was considerable similarity of behavior from child to child at an age, and for many of the items, a sharp age distribution.

Behavior in the sixth category, i.e., *exploitive or original behavior*, was found not to be frequent nor uniform enough from child to child to warrant such treatment. Instead, all exploitive or original behaviors of 50 individual children (25 of average, 25 of superior intelligence), were listed. Since records for many of the children were available at more than one age level, actually more than 50 individual examinations were thus analyzed. The extent to which behavior in each category appeared at the different age levels is presented in tabular and bar diagram form.

Further discussion characterizes variant behaviors typical of each age level; and indicates which situations in the total examination evoke the most variant behavior. The individual child's pattern of response to the total examination is also discussed.

C. SIX TYPES OF VARIANT BEHAVIOR

As described in the preceding section, the variant behavior of preschool children observed in the developmental examination was considered as falling into the following six categories:

1. Out-of-field behavior, motor.
2. Out-of-field behavior, verbal.
3. Reverted behavior which remains in character but sinks to a lower level.
4. Perseverative behavior.
5. Emotionally tangential behavior.
6. Exploitive or original behavior.

Data with regard to the first five types were so uniform in character that they can be presented in tabular and bar diagram form. The sixth type, exploitive or original behavior, will be discussed separately.

The following table indicates the number of times each of these types of variant behavior was observed in the present subjects—50 at each age level—at successive age levels from 18 to 60 months (Table 1). The following bar diagram (Figure 1) presents the

TABLE 1
INCIDENCE OF FIVE TYPES OF VARIANT BEHAVIOR

Age in months	No. of responses of each type						Total	
	18	24	30	36	42	48		60
Out-of-field behavior, motor	411	488	<u>536</u>	356	225	121	66	2,203
Out-of-field behavior, verbal	142	252	543	1,067	1,453	1,365	<u>1,503</u>	6,325
Reverted behavior	176	228	257	<u>345</u>	300	224	209	1,739
Perseverative behavior	8	18	118	<u>131</u>	100	51	23	449
Emotionally tangen- tial behavior	217	<u>251</u>	244	188	100	62	63	1,125
Totals by ages	954	1,237	1,698	2,087	2,178	1,823	1,864	

same data in graphic form. It gives the composite picture for each age level, showing the relative extent of occurrence of the first five types of variant behavior at the several age levels.

The general *age trend*, described in more detail on pages 299 to 302, is as follows:

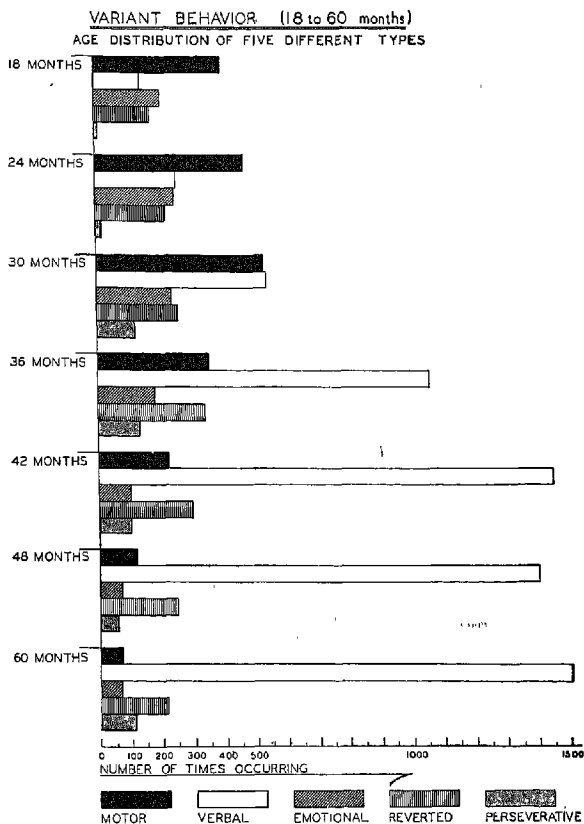


FIGURE 1

18 months: Motor responses predominate, with emotional responses next in frequency.

24 months: Motor responses still predominate markedly, though verbal have increased and now equal emotional.

30 months: Verbal responses for the first time equal motor. These two are outstanding. Perseverative responses are for the first time strong.

36 months: Verbal responses definitely exceed all others though motor and reverted responses occur frequently and perseverative responses reach their peak.

42-60 months: Verbal responses by far predominate. Specific deterioration is prominent. Other types occur very little.

The general trend by categories is as follows:

Motor responses increase till 30 months and then fall off steadily.

Verbal responses increase steadily till they reach a peak at 60 months.

Emotional behavior is relatively strong at all ages from 18 to 36 months, reaching its peak at 24 months.

Reverted behavior is strong at all ages, rising to a peak at 36 months.

Perseverative behavior, relatively strong at 30 to 42 months, reaches a peak at 36 months.

Elaborative behavior, seldom seen at 18 and 24 months, increases and reaches its peak at 48 months.

A more detailed treatment of the several types of variant behavior is given in Tables 2, 3, and 4 which indicate to what extent each of the many different kinds of *motor*, *verbal*, and *emotional* responses occur at the different ages. To obtain a concise impression of just what responses occur in each of these categories at any age, the tables may be read vertically. To determine the age trends for any special behavior response, they may be read horizontally.

No table has been given for *perseverative behavior*, since in this type of behavior individual differences are too marked to make tabular presentation feasible.

Reverted behavior is taken up separately for each situation in age gradation, in the section on genetic gradations (pp. 294-299). Though such behavior is specific to each situation, it appears that general kinds of behavior, such as picking at test objects or turning them over, tend to occur at certain ages regardless of the exact nature

TABLE 2*
MOTOR RESPONSES

Age in months	No. of occurrences at each age level						
	18	24	30	36	42	48	60
In and out of chair	89	89	90	83	47	24	18
Leaves table	65	74	73	58	41	25	16
Casts objects	49	12	11	1	1	0	0
Runs around room	24	29	21	7	0	0	0
Turns things over	21	22	27	24	9	5	3
Hands things to mother	21	26	23	11	2	0	0
Clings to material	21	17	13	6	2	1	0
Hands material to Examiner	20	18	14	7	6	2	3
Goes to mother	16	21	23	11	8	7	0
Stands to perform	15	23	21	11	3	1	1
Goes to cabinet	21	43	30	36	29	14	13
Pushes material away	10	19	17	7	6	1	1
Builds on model	1	27	25	12	7	2	0
Moves furniture	8	20	21	16	8	1	0
Stands or climbs on chair	7	13	18	15	5	2	2
Stands or climbs on table	5	15	31	10	10	3	1
Grabs model or material	11	8	20	10	14	5	2
Destructive manipulation	4	4	15	2	4	2	2
Physical resistance to demonstration	2	1	14	0	0	0	0

*Underlining indicates ages at which a behavior predominates.

of the stimulus object. A very brief summary of reverted behaviors, by ages, follows:

18 months: Child grabs, scatters, or brings material to his mouth; scribbles with crayon or rod.

24 months: Picks at objects; makes indiscriminating responses with test objects.

30 months: Turns things over; replies "No" to verbal tests; places objects rigidly in set formations.

36 months: In drawing and cube situations manipulates materials but in a manner normative for a younger age; replies "No" to verbal tests

42 to 60 months: Much variety from one situation to another.

Elaborative Behavior. One further group of variant behaviors is that including exploitive, elaborative, and original behaviors. To begin with, an effort was made to determine the occurrence of elaborative and of original behaviors as separate categories, and to

TABLE 3
VERBAL RESPONSES

Age in months	18	24	30	36	42	48	60
Distressed jargon	22	6	1	0	0	0	0
Refuses to answer	20	39	53	58	44	19	28
Shakes head "no"	6	10	14	10	13	6	19
"No"	20	55	100	86	95	43	44
Suggests other materials	5	34	54	62	42	21	15
Verbal reference to mother	12	12	35	82	68	32	4
"I don't know"	0	0	17	83	123	134	108
Relevant remarks	0	24	34	94	131	145	185
Questions Examiner	0	6	12	72	124	126	123
"I can't"	0	2	10	50	63	27	14
"I can't" + other words	0	0	7	46	59	58	64
"No" + other words	0	0	17	30	60	41	46
"You do it"	0	0	16	29	44	19	8
"I don't want to"	1	3	7	14	51	27	23
Suggests other activity	0	2	11	32	52	29	25
"You tell me"	0	0	0	6	17	37	5
Irrelevant associative remarks	1	4	16	50	51	96	107
"I don't know how"	0	0	0	3	11	16	18
"Hey, ow," etc.	0	5	7	18	28	59	71
"Funny"	0	0	0	6	1	35	38
Exaggerated talk or boasting	0	0	0	4	21	59	87
"Hard, easy," etc.	0	0	0	0	4	16	53
Excuses	0	1	17	9	25	16	32
Self criticism	0	0	0	1	6	21	40
"I know"	0	0	0	0	4	12	34
"I think"	0	0	0	9	13	13	22
"I forgot"	0	0	0	0	1	7	16

make some quantitative presentation of the findings. This turned out not to be feasible. Actually very little behavior was observed which did not either (a) fit into the usual normative sequence or (b) fall under one of the previously described categories. Most children appeared to show little behavior during the examination which could be classed as either elaborative or original.

Particularly was this true of the 18- and 24-months age groups. At 30 months and thereafter the majority of children did exhibit at least one behavior, usually verbal, during each examination, which could be classified as original or elaborative. The occurrence of such behaviors increased from three years on, but even at these ages there

TABLE 4
EMOTIONAL RESPONSES

Age in months	18	24	30	36	42	48	60
Hand to mouth	24	7	8	10	9	5	6
Tears in eyes	10	14	3	1	0	0	0
Cries	9	8	3	3	2	0	0
Refuses or slow to sit	24	28	17	15	10	9	12
Refuses to play or accept materials	26	23	24	8	5	2	2
Refers to mother	62	80	78	60	28	19	14
Just sits, no response	18	27	60	55	12	7	4
Smiles at mother	0	10	6	17	8	9	0
Laughter	28	21	28	25	20	25	13
Asks for mother	0	1	2	2	4	10	8
Mouth movements	0	0	0	0	0	0	18

were not enough of them to yield to quantitative treatment. A list of some of the more original of these responses, from 30 months on, follows (Table 5).

All of these original behaviors listed were observed in our group of superior cases. Original behaviors occurred among the average cases to a much lesser extent. Table 6, based on the elaborative behavior of 25 average and 25 superior cases, indicates that at all ages at least twice as many elaborative behaviors were observed in each child of superior intelligence as in the children of average intelligence. However there are marked individual differences in this respect. Some of the superior children have many elaborative responses at all ages and some have few.

D. INDIVIDUAL VARIATIONS

1. *At What Point in the Examination Do Variant Behaviors Occur?*

The following table (Table 7) indicates which situations in the examination elicit the most variant behavior. Cases were analyzed first to determine the situation or situations which elicit the *most immature variant behavior*. This determination was easily made since we have already assigned to each type of variant behavior an age designation. Some children during the course of an examination reach a lowest point only once; some do so repeatedly. The number of times that any one particular situation was found to be the low-

TABLE 5
EXAMPLES OF ELABORATE BEHAVIORS IN SUPERIOR CHILDREN

Age in months	Situation	Response
30	Train	Refuses to push "because it is standing still."
36	Goddard formboard	Names blocks "star," "moon," "airplane,"
42	Comprehension	House on fire? "Well, my house don't get on fire."
42	Define pencil	"To sharpen knives with."
42	Comprehension	Miss your bus? "Nothing. I do something when I don't."
48	Goddard formboard	"Somebody might come in here. Won't that be funny? While I'm working. . . . Into his own hole he goes. He goes in that direction. He lives next door to that one. He lives far away. There's three houses and this one lives next door."
48	Spontaneous drawing	Draws a lion in a cage. "Can't get his head out. . . . Don't look very much like a lion—he's over the other side." Then draws a puppy. Seems to be thinking about it as draws. "Small waggy tail—his head—that's his mouth—something in it."
48	Weights	"There aren't any more heavy ones. They aren't heavy."
54	Action-agent	What runs? "Street cars, choochoos, cars, trucks, everything except things that stand in the ground."
54	Cubes	Told that cubes are too big for the boxes says, "I guess you can stretch boxes."
54	Drawing	Draws a "winter tree."
54	Goddard formboard	Hides her eyes and then tries to put blocks in without looking. Says to Examiner, "You have them all wrong. I'll have to do them all over and get them in the right place." Rearranges them, verbalizing, so that they come in the same order as those on the board.
54	Pennies	Makes a "T" and other forms out of the pennies.
60	Stanford card	"I told you last year. The lady is still worried 'cause the child is crying." (Not what he actually said last year.)
60	Diagonal	Makes it with big round knobs at all line crossings. Says, "It's fastened on, see?" The big knobs are "fasteners."
60	Weights	"What makes one a little heavier than the others?"
60	Stanford picture	"I suppose he can read very well. Don't you hope so?"

TABLE 6
ELABORATIVE BEHAVIOR IN AVERAGE AND SUPERIOR CASES

Age in months	No. of occurrences per case	
	Average cases	Superior cases
18	.22	.50
24	.25	1.6
30	1.2	3.5
36	3.0	5.6
42	1.5	6.6
48	3.0	7.0
60	2.2	5.7

TABLE 7
SITUATIONS WHICH ELICIT MOST FREQUENT AND MOST IMMATURE VARIANT BEHAVIORS

Behavior situation	Age in months							Total
	18	24	30	36	42	48	60	
Formboard	59	36	31	19	5			150
Picture Card	36	46	15	5	6			108
Color Forms		42	29	22	6	1		100
Train		36	36	12	1	2		87
Action-Agent		5	45	105	90	62	40	347
Bridge		27	38	22	19	6		112
Sex		8	36	42	16	2		106
Stanford Card			7	9	27	12	6	61
Name			22	12	7	2		43
Digits			5	67	51	36	29	188
Copy Square			1	36	20	16	10	83
Imitates Gate			8	26	19	14	3	63
Comprehension				11	0	5	0	16
Copy Triangle					7	17	12	36
Copy Diagonal					2	11	24	37

est point in the examination was determined. This analysis included any form of variant behavior exclusive of elaborative behavior.

Next, the original data were analyzed to determine the number of times at each age level each situation evoked *reverted behavior* specific to the situation. The combined results indicate that the most frequent as well as the most immature variant behavior was evoked by the action-agent, digits, formboard, bridge-building, picture card, sex, and color-form situations, the first three exceeding the others markedly. The story for each age level can be quickly

read by reading the table vertically and noting the figures which are underlined.

Elaborative behavior occurs much less frequently than other types of variant behavior, and when it does occur is usually elicited by the paper and crayon situation (79 times in all for the 15 cases analyzed for this behavior), and the massed cube situation (67 times in all). The Goddard formboard situation, next in order of amount of elaborative behavior elicited, elicits only 17 elaborative responses in the group of 25 cases.

2. *Progressive Deterioration within a Specific Situation*

Occasionally when a child has responded to a situation with some kind of variant behavior, if the situation is prolonged he will continue making variant responses but of an increasingly immature kind. Thus a three-year-old may start out with a three-year-old "*I don't know*"; go on to a 30-month "*No*" and standing up; and then in an 18-month manner leave the table and run around the room. This does not occur in a similar enough manner from child to child to allow any tabulation of such responses, but the following individual examples will indicate the kind of responses sometimes observed.

Child MC, 4 years, *Copies Circle* (1 trial). Copies circle correctly; then starts scribbling; then taps pencil on paper.

Child BT, 30 months, *Imitates Cross* (3 trials). Two lines which do cross; two lines in the same direction; scribble.

Child AF, 30 months, *Imitates Cross* (3 trials). Two horizontal marks; horizontal scribble; vertical scribble.

Child GD, 30 months, *Picture Card*. Names lady; turns card over; asks for a penny.

Child TR, 42 months, *Picture Card*. Says "*So many things I can't*"; leaves table; climbs on mother; climbs on table.

Child FA, 24 months, *Action-agent*. Repeats Examiner's question; laughs; no response; changes subject.

Child MT, 30 months, *Action-agent*. Answers correctly; relevant remarks; no response; climbs on table; says "*No*."

Child BR, 30 months, *Action-agent*. Lies on table while answering correctly; repeats Examiner's last word; fingers to mouth; silent and looks around room.

Child AD, 36 months, *Action-agent*. Answers correctly; repeats Examiner's last word; stands up.

Child *DM*, 48 months, *Action-agent*. Answers correctly; says "Idk"; says "I don't know"; fidgets; gets up.

Child *NT*, 69 months, *Action-agent*. Answers correctly; says "I can't 'member"; says "I don't know"; no response.

Child *VP*, 36 months, *Digits*. Answers correctly but bangs on table; answers correctly; answers wrongly and gets up; no answer and climbs on table.

Child *AD*, 42 months, *Digits*. Says "I can't"; gets up from chair; shakes head "No."

Child *RW*, 48 months, *Digits*. Says "No"; says "No I can't"; says "Four"; no answer.

Child *TV*, 60 months, *Digits*. Says "I don't want to say that"; "Mommy said I didn't have to do that"; "No."

Child *EP*, 36 months, *Tells Sex*. Says "I don't know"; "No"; shakes head "No."

Child *LD*, 42 months, *Tells Sex*. Laughs; says "I don't want to", says "Nothing."

3. *Types of Response to Inability to Meet Examination Situations as Expressed in Variant Behavior*

To the question: *What does the preschool child do when he is unable or unwilling to perform or to continue performing the task set by the Examiner in the developmental examination situation?* we have answered that there appear to be five outstanding types of response which he may make, as follows:

Out-of-field responses, motor or verbal.

Emotionally tangential responses.

Perseveration of inadequate responses.

Reverted responses. Simpler responses within the situation.

Within the first three kinds there are wide variations, suggesting very different ways of meeting the situation. Outstanding are responses expressing withdrawal, aggressive responses, dependent responses, and refusals to attempt the task. A simple tabulation indicates these as follows:

Motor:

Withdrawal or removing self from situation:	In and out of chair Leaves table Runs around room Climbs on chair or table
--	---

Aggressive responses:	Casts objects Tears or destroys materials Knocks down model Clings to material and won't give it up Moves furniture Grabs at model or material Physical resistance to demon- stration
-----------------------	---

Verbal:

Withdrawal or changing subject:	Makes irrelevant remarks Suggests other material or activity Suggests leaving
------------------------------------	--

Dependent responses:	Asks help from mother or Examiner Says "You do it," or "You tell me"
----------------------	---

Refusal to attempt:	"No" Shakes head "No" "I don't know" "I can't" "I don't want to" Refuses to answer
---------------------	---

Varied:	Makes excuse Boasts or exaggerated talk Elaborative relevant talk Self criticism
---------	---

Emotional:

Withdrawal responses:	Just sits, no response Won't accept or utilize material Won't talk Tries to leave room
-----------------------	--

Dependent responses:	Clings to mother Goes to mother Some reference to mother
----------------------	--

Aggressive (?) response:	Cries
--------------------------	-------

It appears, then, that a child may respond to inability to perform set tasks within the examination situation by withdrawing from the

situation either physically or otherwise, by refusing to attempt the task, by making aggressive responses, by seeking help, by perseveratively repeating some inadequate response, or by manipulating given materials in a simpler manner than the one requested by the Examiner.

That these responses are probably characteristic for other children than the immediate subjects of this study is suggested by the marked similarity of the present findings with those of Rust (10). Table 8 indicates marked similarity between behavior of these two different groups of three-year-olds when "not attempting tests" in the developmental examination. This in spite of the fact that we do not agree with Rust in labelling all such behaviors "resistance behaviors."

TABLE 8
COMPARISON OF RUST'S FINDINGS WITH DATA OF PRESENT STUDY: RESPONSES OF
THREE-YEAR-OLD CHILDREN

<i>Verbal Response</i> <i>Rust (84 children)</i>		<i>Verbal Response</i> <i>Present Study (50 children)</i>	
<i>Response</i>	<i>Frequency</i>	<i>Response</i>	<i>Frequency</i>
"No"	211	Relevant remarks	94
"I don't know"	83	"No"	86
"I can't"	73	"I don't know"	83
"I don't want to"	53	Questions Examiner	72
Relevant remarks	53	Suggests other material	62
Suggests other material	52	"I can't"	50
Suggests other use	34	Irrelevant remarks	50
Questions Examiner	23	"I can't" + other words	46
"I can't" + other words	21	Suggests other activity	32
Irrelevant remarks	21	Asks for help	29
Asks for help	5	"I don't want to"	14
	629		618
<i>Motor Response</i> <i>Rust</i>		<i>Motor Response</i> <i>Present Study</i>	
Walks away	142	Walks away	58
Pushes material away	33	Pushes material away	7
Destructive manipulation	2	Destructive manipulation	2
	177		67
<i>Remains Silent</i>	686	<i>Remains silent</i>	113

A few of the differences shown in the table may be due to differences in recording. In Rust's list the word "No" (a 30-months variant response) appears disproportionately. For five responses the order of frequency of occurrence is the same in the two groups.

The five responses are, in order of decreasing frequency: "No," "I don't know," "I can't," suggesting other use of material, asking for help.

4. *Variance Pattern for Total Individual Examination*

The method used for charting the individual pattern was a relatively simple one, as follows. For each situation the child was rated as behaving *at age* if the response was an adequate one for his age in regard to the situation presented, or if the response remained *in kind*. That is, in the bridge situation if he attempted to build a bridge, even though the bridge might fall, behavior was charted as being at age. Successive points on the graph indicate the examination situations in order.

Any sort of variant behaviors *not specific to the situation* were charted as being at their characteristic ages (see pp. 281-283). Thus if the child left the table, referred to his mother, asked for other material, talked in an irrelevant manner, etc., these responses were charted as being at the age characteristic of such responses. Elaborative behavior was indicated in the chart as being above the chronological age level.

Several points might thus be charted for any one situation. A child might start out with an adequate response, might make a brief elaborative response, and then might say "I don't know" or might leave the table. The chart for that situation would show first a mark at the chronological age level, would then rise above the age level for the elaborative behavior, and would drop to 36 months for "I don't know" and to 24 months for leaving the table.

The charting is made in this manner to simplify the presentation of elaborative and variant behavior. A more complicated charting which would include actual responses to situations as well, would show the age rating of each response which remained in kind, indicating whether it was better than the chronological age or worse. It would also indicate reverted behavior within a situation (see pp. 294-299), e.g., if a child stayed with the cubes but made a train instead of a bridge, or built onto the model.

The chart is intended to present a total picture of the flow of the whole examination and to make possible a comparison of individual cases, and of "average" as compared to "superior" behavior. A more

detailed presentation of each situation would tend to complicate this picture.

Such charting of a large number of cases within the present group suggests the following conclusions:

a. Individual differences are many and varied. No child was found to have the same or even very similar patterns for any two examinations. No two children were found to have the same or even very similar patterns. No characteristic age patterns were observed.

b. This method of charting, however, was seen to give a clear over-all picture of the flow of the examination. The following are some of the various types of patterns observed: Examination going along smoothly at age until near the end, when variant behavior falls to an increasingly lower age level; some variant behavior in nearly every situation but each new situation is responded to first at age, and after deterioration child comes right up at next situation; examination going smoothly at age except for two or three dips in certain situations; child is slow to warm up but then does well.

c. There tends to be a fairly common smoothing out of the pattern by 60 months though this is not invariable; in some cases an increased amount of elaborative behavior is observed at 48 and 60 months.

d. Comparative individual patterns for a child of average and one of superior intelligence are presented in Figure 2. These have been selected as representative of the behavior of these two groups of children. There is a great deal more both of elaborative behavior and of variant behavior in general in the superior child.

A further individual difference often appears in the general *kind* of response a child makes to examination situations when they are too difficult for him. This has not been worked out in detail, but clinical observation of the manner in which three of our cases typically and habitually responded when confronted with too difficult situations is suggestive:

KA: sucked his thumb or sought his mother (sought reality).

KM: remained quiet and stared unseeingly into space (went into unreality).

JA: his tension rose and he resisted, physically (went up against reality).

TYPICAL INDIVIDUAL EXAMINATION PATTERNS

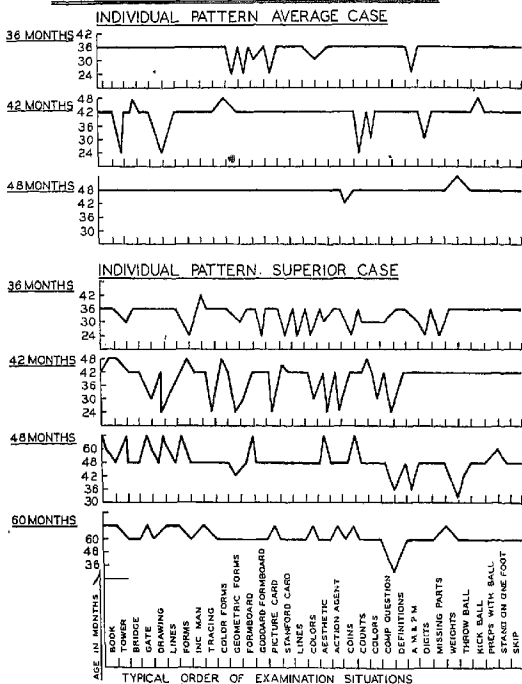


FIGURE 2

E. GENETIC GRADATIONS AND THE AGE PATTERN

1. Genetic Gradations

a. Genetic gradations for motor, verbal, and emotional responses.
Data on certain kinds of variant behavior were gathered in sufficient detail to allow responses to be arranged in genetic gradations

according to their most characteristic age of appearance. Genetic gradations are presented for the following general kinds of responses: Motor responses; verbal refusals; other verbal responses; references to mother; requests for other material; and emotional responses.

TABLE 9

Behavior	Range in months	Peak
<i>Gradient for Gross Motor Behavior</i>		
Runs around room	18-30	18
Leaves table	18-36	18
In and out of chair	18-36	18, 24
Goes to cabinet	18-42	24
Stands to perform	24-30	24
Moves furniture	24-30	24, 30
Stands or climbs on chair	24-36	24
Stands or climbs on table	30	30
<i>Gradient for Fine Motor Behavior</i>		
Casts objects	18	18
Tears objects	18	18
Clings to material	18-30	18
Refuses to play or accept material	18-30	18
Hands material to mother	18-30	24
Pushes material away	24-30	24
Builds on model	24-30	24, 30
Hands material to Examiner	18-30	30
Turns things over	18-36	30
Destructive manipulation	30	30
<i>Gradient of Verbal Refusals</i>		
Distressed jargon	18	18
Shakes head "No"	18-30	30
Refuses to answer	18-36	30
"No"	18-42	30
"I can't"	42	42
"You do it"	42	42
"I don't want to"	42	42
"No" + other words	42-60	42
"I don't know"	36-60	48
"You tell me"	48	48
"I can't" + other words	60	60
Makes excuses	60	60
<i>Gradient of Other Verbal Responses</i>		
Questions Examiner	42-60	42, 48
Relevant remarks	42-60	42, 60
Irrelevant remarks	48-60	48, 60
Hey, ow, etc.	48-60	48, 60
Exaggerated talk or boasting	48-60	48, 60
Hard, easy	60	60
Self criticism	60	60

TABLE 9 (continued)

Behavior	Range in months	Peak
<i>Gradient of Kinds of Reference to Mother</i>		
Clings to mother and won't release	18	18
Clings to mother but releases	18-24	24
Goes to mother	18-30	24
Moves chair near to mother	24-30	24, 30
Hands object to mother	18-30	24
Shows object to mother	24-36	36
Asks mother's help	30-42	36
Verbal reference to mother	30-48	36
Smiles at mother	36-48	36
No reference to mother	42-60	42 ff
Asks about mother	48	48
<i>Gradient of Requests for Other Material</i>		
Goes to cabinet	18-42	24
Asks for other material by gesture	24	24
Asks for other material	30-36	30, 36
Asks for other activity	42	42
<i>Gradient of Emotional Responses</i>		
Cries	18-24	18
Hand to mouth	18	18
Refuses to play or accept material	18-30	18
Refuses or slow to sit	18-24	24
Tears in eyes	18-24	24
Just sits, no response	30-36	36

b. *Genetic gradations for reverted behavior, by situations.* So far, variant behavior discussed has been of a kind which can and does appear at any point in the examination regardless of the type of question or situation presented. *Reverted behavior*, however, is by definition specific to specific situations. It consists of behavior which, usually starting at a normative level, sinks to a lower level than the normative expectation but remains in character. The child responds to the stimulus object or question presented. Thus if the task presented is bridge building with the cubes, the child responds to the cubes but makes a train or tower or places the cubes at random.

Data on this kind of variant behavior were gathered as follows. The 50 examinations at each age level were analyzed for all types of responses which were less good than the normative expectation but which remained specific to the situation, that is, remained in character. All such responses were listed under the age levels where they were observed. Check marks indicated how many times a behavior was observed. Contrary to the former method of indicat-

ing by check mark *every* time a child exhibited a behavior, only one check mark was made for one child's response within a situation. If the response was exhibited repeatedly (i.e., child repeatedly made a train instead of a bridge) no additional checks were made.

For many, though not for all, situations in the behavior examination a simple genetic gradation of reverted behavior specific to the situation could be drawn up. These are presented in list form. The figure following in each case the name of the situation indicates how many reverted behaviors were observed in that situation. (This is also discussed on page 285 where consideration is given to which situations in the examination evoke the most reverted behavior.) Situations are presented here in the order in which they occur in the examination (Table 10).

TABLE 10
GENETIC GRADATIONS FOR REVERTED BEHAVIOR

Picture Book (17)

- | | |
|-----------|--|
| 15 months | Drags book off table
Puts book on head
Tears pages from book |
| 18 months | Grabs at pages as Examiner turns |
| 24 months | Picks at pictures
Won't allow pages to be turned
Takes book to mother
Closes book and hands to Examiner |
| 30 months | Perseveratively calls all pictures by same name |
-

Tower Building (31)

- | | |
|-----------|---|
| 18 months | Casts cubes on floor
Cube on cube but no release
Taps cube on table top |
| 24 months | Knocks over own tower
Removes top cube as Examiner places it |
| 30 months | Verbal reference to falling |
| 36 months | Double tower |
-

Train Building (105)

- | | |
|-----------|--|
| 18 months | Casts cubes
Keeps on with tower building
Pushes cubes together into a mass |
| 24 months | Builds tower on model
Hands cube to Examiner
Cube to model but no release
Builds on model |
| 30 months | Reaches for model or pulls toward self
Chimney at each end of train |
-

TABLE 10 (*continued*)

<i>Bridge Building</i> (112)	
24 months	Brings a cube to model
24-30 months	Builds on model
30 months	Builds tower
	Builds flat bridge
	Pulls model toward self
30-36 months	Builds train
	Builds bridge with no doorway
36 months	Pushes bridge up to model
42 months	Pulls model toward self
	Fills in doorway of model
<i>Gate Building</i> (63)	
30 months	Tower
36 months	Bridge
	Tries to tilt cube but it falls
	Pulls model toward self
36-42 months	Knocks down model
42 months	Reaches for model
	Knocks down own when partly built
	Builds on model
48 months	Uses cube from model
	Builds side towers but doesn't tilt cube
<i>Cup and Cubes</i> (34)	
18 months	Cup to mouth and drinks or says "drink"
	Tower in cup
30 months	Rigid placement in cup, just so
<i>Pellet and Bottle</i> (24)	
18 months	Eats pellet
	Pokes finger into bottle
	Pokes at pellet through glass
	Shakes bottle
24 months	Pellet to mouth but doesn't eat
<i>Drawing in General</i>	
18 months	Taps crayon on paper
	Scribbles on table top
	No modification of scribble on demonstration
	Idle combination of crayon and paper
24 months	Scribbles on drawing
	Won't give up crayon
	Picks at paper on crayon
30 months	Just scribbles no modification on demonstration
	Breaks crayon
	Writes with wrong end of crayon
36 months	Turns paper over
48-60 months	Erases (not an actual reversion)
<i>Vertical Stroke</i> (20)	
18 months	Dabs at paper with crayon
	Horizontal scribble
	Vertical scribble
	Angular scribble
24 months	Angular or circular scribble
	Small horizontal strokes

TABLE 10 (*continued*)

<i>Horizontal Stroke</i> (41)	
18 months	Taps on paper Horizontal scribble Vertical stroke
24 months	Vertical strokes Circular scribble
<i>Imitates Circle</i> (39)	
18 months	Taps on paper Angular scribble Horizontal scribble on model
24 months	Horizontal scribble Vertical marks Horizontal marks
<i>Copy Circle</i> (62)	
24 months	Angular scribble
30 months	Tries to mark on model Horizontal scribble Vertical lines
36 months	Horizontal lines Circular scribble
<i>Imitates Cross</i> (85)	
18-24 months	Scribbles over demonstration
30 months	Two vertical strokes Two horizontal strokes
36 months	Two strokes, not crossing, one horizontal, one vertical
42 months	Circles Connects up corners
<i>Copies Cross</i> (41)	
30 months	Angular scribble Circular scribble
36 months	Horizontal and vertical marks, not near together Circle
<i>Copies Square</i> (83)	
36 months	Circular scribble Horizontal marks
42 months	Circle Cross Square, but corners not meeting Two sides of a square with curved line connecting ends
60 months	Correct, but one corner rounded
<i>Copies Triangle</i> (41)	
36 months	Two vertical marks
42 months	Circle
48 months	Square Triangular figure with an extra point at the top Three sides of a square
69 months	Triangle but with one side rounded

TABLE 10 (continued)

Color Forms (100)

24 months	Picks off attached form Puts form in wrong places Puts all forms on circle Hands form to mother Throws form
30 months	Turns card over Verbal reference to picking off attached form
36 months	Tries to paste form on Laps form
42 months	Verbal reference to pasting form on

Geometric Forms (38)

24 months	Tries to pick off printed form
30 months	Turns card over Hands form to Examiner
36 months	Places instead of pointing
42 months	Points inaccurately

Formboard (150)

18 months	Piles forms Bangs block on board
24 months	Hands block to mother or Examiner Lifts board and moves it around
30 months	Claps forms together Tries hard to force into wrong holes Stands blocks on edge
36 months	Insists on rotating board

Picture Cards (108)

18 months	Pushes card away and crumples or tears it
24 months	Points indiscriminately Hands card to mother
30 months	Turns card over Hands card to Examiner Points to wrong things
30-42 months	Perseveratively calls all pictures by same name
36 months	"I don't know"
42 months	"You tell me"

*Action-Agent (347)**Verbal Responses*

30-36 months	No response Repeats Examiner's last word
36 months	"I do" Asks for something else
36-42 months	Perseverates with some one response
42 months	"Idk" "I can't" or "I can't" + other words "Nothing"
42-48 months	"I don't know"
60 months	Makes excuses

TABLE 10 (*continued*)

<i>Motor Responses</i>	
30 months	Leaves table
36 months	Stands
42 months	Slips down in chair
	Wriggles, fingers clothes
<i>Digits</i>	
30-36 months	No response
	"No"
36-42 months	"I can't say that"
42 months	"I don't want to"
42-48 months	Says but wrongly
60 months	Excuses
<i>Gives Name (50)</i> . (Great variety from child to child)	
30 months	No response
36 months	"No"
<i>Tells Age (28)</i>	
30 months	No response
36 months	"No"
42 months	Asks mother; shrugs shoulders
<i>Directions with Ball (41)</i>	
18 months	Goes and sits on chair
24 months	Just throws instead of directions
	Throws but to correct places
30 months	Places ball but in wrong places
<i>Kicking Ball (50)</i>	
18 months	Picks up and throws
	Walks into
24 months	Pushes with hands
30 months	Rolls
36 months	Bounces
<i>Performance Box (51)</i>	
18 months	Scribbles with rod
	Saws rod back and forth in hole
	Gross manipulation of box
	Rod into hole but no release
	Pokes finger into hole
24 months	Block in at open end of box

2. The Age Pattern

a. *Variant behaviors most characteristic of each age level.* When numerical summaries of the number of times each variant behavior item occurred at each age level were drawn up, it was observed that for most items there was a sharp age distribution, although some behaviors were observed to a marked degree over a period of several months. Behavior items were arbitrarily considered *most* characteristic of that age when they *first* appeared to a large extent. An ex-

ception to this rule was in cases where a lone peak occurred at an age later than the one where the behavior first appeared to a large extent.

A summary of the behavior items most characteristic of each age (all types combined) follows. In one or two instances a behavior item is listed under more than one age level. Figures following items indicate number of times behavior was observed with the present group of 50 cases at an age level (Table 11).

TABLE 11

<i>18 months</i>	
In and out of chair	(89)
Leaves table	(65)
Casts objects	(49)
Runs around room	(24)
Refuses or slow to sit	(24)
Hand to mouth	(24)
Distressed jargon	(22)
Clings to material	(21)
Goes to cabinet	(21)
Cries	(9)
Tears objects	(6)

<i>24 months</i>	
In and out of chair	(89)
Some reference to mother	(80)
Leaves table	(74)
Goes to cabinet	(43)
Refuses to answer	(39)
Runs around room	(29)
Refuses or slow to sit	(28)
Builds on model	(27)
Hands object to mother	(26)
Refuses to play or accept material	(23)
Stands to perform	(23)
Goes to mother	(21)
Moves furniture	(20)
Pushes material away	(19)
Tears in eyes	(14)
Stands or climbs on chair	(13)
Asks for other material by gesture	(9)
Clings to mother	(7)

<i>30 months</i>	
Says "No"	(100)
In and out of chair	(90)
Leaves table	(73)
Just sits, no response	(60)
Asks for other material	(54)
Refuses to answer	(53)
Sits or climbs on table	(31)
Goes to cabinet	(30)

TABLE 11 (*continued*)

	Turns things over (30)
	Builds on model (25)
	Refuses to play or accept material (24)
	Grabs model or material (20)
	Destructive manipulation (15)
	Physical resistance to demonstration (14)
	Hands material to Examiner (14)
	Shakes head "No" (14)
36 months	
	Relevant remarks (94)
	"I don't know" (83)
	Verbal reference to mother (82)
	Goes to cabinet (36)
	Smiles at mother (17)
	Shows object to mother (9)
42 months	
	Relevant remarks (131)
	Questions Examiner (124)
	"I can't" (63)
	"No" + other words (60)
	Asks for other activity (52)
	"I don't want to" (51)
	"You do it" (44)
	"Nothing" (25)
	"Why?" (12)
48 months	
	Questions Examiner (126)
	Irrelevant remarks (96)
	"Hey, ow," etc. (59)
	Exaggerated talk or boasting (59)
	"You tell me" (37)
60 months	
	"I can't" + other words (64)
	"Hard, easy," etc. (53)
	Self criticism (40)
	Excuses (32)
	"I think" (22)
	"I forgot" (16)

b. Descriptive characterization of each age level (Table 12).

TABLE 12

18 months: Variant behavior at this age is chiefly motor, with some emotional and very little verbal. There is little rapport between child and examiner. Child is not influenced by verbal suggestions to any extent. Is apt to cast objects. Often refuses to sit at table and if does sit gets up and down frequently. Very likely to leave table altogether, and to run about the room. May cry and may cling to toys. Attention span is very brief and examination must be conducted rapidly.

TABLE 12 (continued)

24 months: Though the child still gets up and down from his chair frequently, and by actual count leaves the table as often as at 18 months, the examination seems to go smoothly, with good rapport between child and examiner, perhaps because verbal responses and response to verbal approaches are coming in. Motor variant responses still predominate but verbal and emotional have increased in frequency. This is the outstanding age for emotional responses and for reference to and dependence on the mother, particularly for going to the mother. Dependence is also suggested by building onto models. Child shows an interest in small objects and picks at things with his forefinger.

30 months: This is the last age level at which motor variant responses occur prominently. For the first time verbal responses are as numerous as motor. Characteristic of this age is rigid, set behavior, rigid placement of objects, perseverative repetition of responses. Behavior is often ritualistic and as if under compulsion. There is a balancing of responses, right hand versus left, neither leading; adding a second chimney to the train for balance. Turning objects over brings in the other side. Child may set up a "You do it"—"No" response with Examiner.

36 months: At this age, though the actual number of variant responses is greater than at any age but one (42 months) the examination appears to proceed smoothly. This is the age at which verbal variant responses first exceed motor responses (about three times as many verbal as motor). Children usually remain at the table and merely say "No" or "I don't know." Often the Examiner can bargain with a child of this age. However, the peaks for specific variant behavior and for perseverative behavior occur here as well as the greatest number of verbal variant responses to date.

42 months: Variant behavior at this age is quite similar in many respects to that seen at 36 months. Verbal variant behavior is by far the most frequent. Motor behavior has now sunk to third place, specific reverted behavior surpassing it. Variant behavior most often takes the form of verbal refusal: "I can't," "I don't want to," "No," "You do it." There are foreshadowings of four-year-oldness in questioning Examiner, making relevant and irrelevant remarks, talking in an exaggerated manner. By actual count the greatest number of variant behaviors are observed at this age.

48 months: From this age on, not only is there less variant behavior, but what there is is nearly all either verbal or specific within a situation. Such verbal variant responses as do occur are characteristic of four-year-old behavior in general (1, p. 276). The child talks a great deal, sometimes relevantly and sometimes irrelevantly, questions the Examiner, boasts, uses such expressions as "Hey," "Ow," etc., and often seems to be the one doing the examining.

60 months: By this age we see very little variant behavior in many children. What there is is almost entirely verbal. General remarks both relevant and irrelevant and questions set the Examiner are most frequent. Boasting still occurs but excuses and self-criticism are coming in. Many children, however go right through the examination at this age with practically no variant behavior, verbal or otherwise.

F. SUMMARY

1. This study discusses the variant behavior of 350 normal pre-school children (50 each at seven age levels from 18 to 60 months) observed in the developmental examination. Variant behavior includes all behaviors exhibited by the child which are not directed toward the carrying out of set examination tasks.

2. Six separate categories of variant behavior were determined as follows: out-of-field behavior, motor; out-of-field behavior, verbal; reverted behavior specific to each situation; perseverative behavior; emotionally tangential behavior; and exploitive or original behavior.

3. The extent to which each of these kinds of behavior was observed at each 6-monthly age level from 18 to 60 months was indicated. The general *kinds* of variant behavior were seen to change markedly with age, resulting in very different behavior pictures at the different ages. Variant behavior was similar enough from child to child to present characteristic age patterns for the whole variant behavior. In brief summary they are as follows:

18 months. Variant behavior is chiefly motor and emotional.

24 months: Variant behavior is chiefly motor and emotional, with verbal coming in.

30 months: Verbal behavior equals motor, and both are very strong. Perseverative responses are coming in.

36 months: Behavior chiefly verbal. Perseverative responses reach their peak, reverted behavior occurs markedly, motor decreases in number.

42-60 months: Variant behavior mostly verbal.

4. Genetic gradations were established for motor, verbal and emotional behavior as well as for kinds of reference to mother and for manner of requesting other material. Also genetic gradations for reverted behavior within each of the specific examination situations were established.

5. Elaborative or original behaviors were found to be less uniform from child to child than were other types of variant behavior. They did not appear to a marked extent before 30 months and from then on occurred much more in children of superior than in children of average intelligence.

6. It was observed that when a child has responded to a situation with variant behavior, if the situation is not removed he will

often continue making variant responses of an increasingly immature kind.

7. Certain situations within the total examination appeared to elicit more variant behavior than others. In general, the most frequent as well as the most immature variant behavior occurred in the action-agent, digits, formboard, bridge, picture card, sex, and color form situations, in that order. The most elaborative behavior occurred in the paper and crayon and massed cube situations.

8. The patterns for individual examinations were charted to give a clear overall, though simplified, picture of the flow of the examination. The total picture for the child of superior intelligence appeared to be more complex than that for the child of average intelligence, there being more variant behavior in general as well as more elaborative behavior for the superior child. Averages appear to exhibit variant behavior *instead of* other behavior; superiors exhibit variant behavior *in addition to* other behavior.

9. Special stress is laid throughout on the importance of considering variant behavior not as mere "resistance" behavior but as an integral and significant part of the child's whole response, which often tells as much about the level of his behavior as do actual scoreable normative responses.

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SHORT ARTICLES AND NOTES

The Journal of Genetic Psychology, 1943, **63**, 307-309

A NOTE ON CONCOMITANT CHANGES IN *IQ* IN A PAIR OF SIBLINGS*

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In a recent article Wallin (1) presents the results of multiple Binet retestings of a pair of siblings over a period of 14 years, representing 27 and 26 tests for *A* and *B* respectively. In his analysis of the changes he found that the gains and losses in *IQ* occurred at different ages for the two girls. He attempts to analyze these fluctuations in relation to occurrences in the lives of the individuals just prior to the changes, thus inferring that specific incidents may result in changes in *IQ*. He does not analyze the curves in terms of concomitant fluctuations, i.e., by comparing the curves of the siblings at the same points in time though at different ages.

One of the interests at the Fels Research Institute is the study of environmental influences upon development. In line with this interest a few *IQ* curves of siblings have been compared, the two or three curves being drawn on the same graph, using time, or calendar dates as the base line (2). Although the number of tests is limited, since these children have not reached adolescence, some of the curves seem to indicate that *IQ* changes tend to parallel each other, suggesting that changes in the common environment may result in simultaneous changes in *IQ* of siblings of different chronological ages. At one period the environment may be such as to accelerate mental development of the children in the family, while at another time it may act to produce losses in *IQ* in the children.

Since in the article referred to, Wallin reports repeated tests over a longer period of time than that covered as yet by the Fels data,

*Received in the Editorial Office on October 1, 1941.

the writer was interested in comparing the curves obtained from his data by the method outlined above. Figures 1 and 2 were constructed

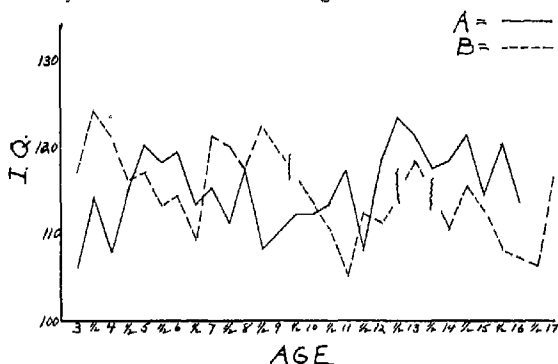


FIGURE 1

IQ's of SIBLINGS AT SIMILAR CHRONOLOGICAL AGES [FROM WALLIN'S DATA (1)]

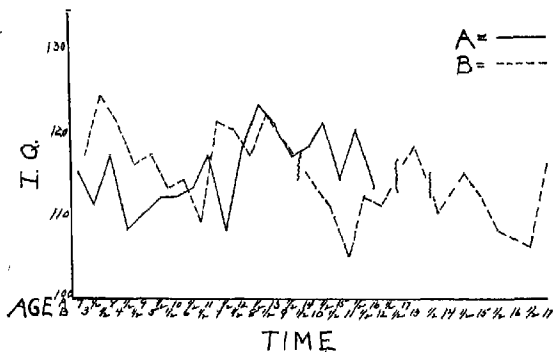


FIGURE 2

IQ's of SIBLINGS AT SIMILAR POINTS IN TIME [FROM WALLIN'S DATA (1)]

ed from the data in Table 1 of Wallin. It will be noted that in Figure 1, as Wallin points out, the fluctuations in *IQ* of the siblings do not seem to parallel each other, except possibly to some extent in the period from 5 to 7 years chronological age. In Figure 2 the *IQ*'s are plotted with time on the base line. Case *B* was four years and three months younger than *A*; therefore when *B* was 3 years of age, *A* was 7 years and 3 months old, so that *B*'s *IQ* at three years is plotted just beyond the point on the abscissa as *A*'s *IQ* at 7 years.

Inspection of Figure 2 reveals that there is more parallelism between *IQ* changes of the siblings than in Figure 1. There appears to be a decline in *IQ* for both *A* and *B* at the beginning of the curve. *A* recovers from this decline before *B* does, however, though *B*'s recovery is more abrupt. The curves then follow each other closely and begin another decline at the same time. This decline is more marked and continuous for *B* than for *A*.

The curves suggest that both girls show similar fluctuations in *IQ* at similar points in time. Imperfections in the tests would tend to obscure this parallelism. It is possible that these concomitant changes are related to common environmental influences operating on both girls. Since Wallin does not present data concerning environmental changes for these subjects, this relationship cannot be investigated.

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BOOKS

The *Journal of Genetic Psychology*, the *Journal of General Psychology*, and the *Journal of Social Psychology*, will buy competent reviews at not less than \$2 per printed page and not more than \$3 per printed page, but not more than \$15.00 for a single review.

Conditions. Only those books that are listed below in this section are eligible for such reviews. In general, any book so listed contains one or more of the following traits: (a) Makes an important theoretical contribution; (b) consists largely of original experimental research; (c) has a creative or revolutionary influence in some special field or the entire field of psychology; (d) presents important techniques.

The books are listed approximately in order of receipt, and cover a period of not more than three years. A reviewer must possess the Ph.D. degree or its equal in training and experience.

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CRITICAL REVIEWS OF RECENT BOOKS

The Journal of Genetic Psychology, 1943, 63, 313-319

(Biber, B., Murphy, L. B., Woodcock, L. P., & Black, I. S. *Child Life in School: A Study of a Seven-Year-Old Group*. New York: Dutton, 1942. Pp. 658.)

REVIEWED BY LOUISE BATES AMES

This book presents an extremely detailed study of a group of 10 seven-year-olds in a progressive school situation. The authors' aim was to describe and, as far as possible to define, a stage in the growth and maturing of children, with special emphasis on the manner in which, as individuals, they differed from each other. Believing that the growth of ideas, the development of interests, and the emergence of attitudes is "a function of the conditions under which development takes place," the authors present a sequential study which is as careful in its description of conditions and influences as of response and behavior within the situations. They believe it necessary that influences of situation, environment, and culture, be included as integral factors which cannot be separated from the courses of biological maturing. They limit their study and their conclusions to this particular group of children, at this particular age, in this particular setting, since they believe that it is futile to hunt for universal human trends. They state definitely, "*There can be no universal descriptions of stages of development. They must be regarded as functions of a cultural complex.*"

The difficulty of presenting a clear picture of seven-year-oldness is enhanced, in the authors' opinion, by the fact that it differs markedly with the specific cultural situation. Furthermore, since "behavior and personality cannot be truthfully summed up or averaged, we can achieve our description of an age level only through detailed study of the patterns of behavior and growth of the individuals comprising the group."

A rather wordy explanation is given of the reason for selecting this particular group for study. The explanation does not seem necessary to this reviewer. The problem is a genuine and important one. A major criticism might be that a group of children ranging in age from 7 years 6 months to 8 years, with mental ages ranging from 7 years 10 months to 12 years 6 months (median $IQ = 130.5$) is not typical of the 7 year old age range. Had the group been a little more typically seven years old, results would have been more directly useful for correlation with findings from other similar studies when such studies become available.

Data collected on the 10 cases are extensive and include primarily the following: (a) Records of observation in school situations (narrative records of behavior observed in reading, writing, painting, clay; shop, rhythm, lunch and roof play situations; short-time sample records; records of discussion periods; stories from children; incidental notes. (b) Psychological examination. (c) Problem-solving situations. (d) Use of projective methods (free play; opportunity to make a play from an assortment of toys; presentation of small cartoon cards; and a Rorschach test.)

Records, particularly of the first group of behaviors, were of a detailed narrative type, taken unselectively, aiming to include if possible each word and expressive gesture of the child in question as well as gross movements and a description of the situation.

The children's behavior in each of the above situations is presented in detail, both for individual children and for the group. Detailed case studies are given for each of the 10 children. A section on "Level of Maturity of the Seven-Year Old" presents a summary view of the age characteristics, grouped around central themes instead of using the more common classificatory headings such as physical-motor development, social development, etc. Noteworthy is the list (p. 569) of areas in which growth appears to be especially volatile. The book ends with a chapter on "Conclusions and Implications for Education" and with appended sample records.

Among the excellent concrete bits of behavior reported as specially characteristic of the 7-year-old are: interest in physical structure of books (in reading situation); interest in the number of books read; need for verbal reinforcement in articulating the sounds while writing; writing and copying letter by letter; disparaging of own writing

and criticism of own products; inability to remain out of direct relation to anything in the environment; free offering of advice, appreciation and criticism to each other in art situations; utilitarian and communicative nature of most language; interest in voting by show of hands; marked interest in telling about likes and dislikes; beginning of interest in games with rules; insistence that something is wrong with tests they cannot solve; the presence of a strong motor component in all thinking and activity; increasing reluctance to exhibit the products of free fantasy and impulse to live more as adults do—realistically, objectively.

Information such as this, scattered throughout the book, is one of its most concrete contributions. There are many of these observations, however, which while accurate, suggest the flatness of a treatment which to a large extent overlooks the developmental point of view. Though this study undertakes to deal only with the 7-year-old, nevertheless more concrete indication of what patterns have been and what they are on their way to becoming, would have been desirable.

A few developmental comparisons are made. For example (p. 589) "If 3-year-olds might be said to think with their muscles, then 7-year-olds might be said to think with their feelings,"—but for the most part such comparisons are lacking. Though the authors have protected themselves by stating that they are describing only the responses of this particular group in this particular situation, nevertheless a wrong impression is frequently given. There is, for instance, considerable stress in the reading situation on oral overflow patterns and on the use of the words "hard" and "easy." What is not made clear is that such behavior commonly characterizes not seven-year-oldness as such, but the beginning of reading (which in a more typical school situation often occurs when the child is six). Furthermore, various overflow patterns are repeatedly described together, almost as if the authors were unaware that there is a developmental sequence in overflow patterns as well as in more directed behavior. Individual variations in overflow patterns are described with equal weight, as if all were equally characteristic of 7 years of age.

As to individual personality portraits, the literature has been definitely enriched by 10 almost uniquely well-documented cases. The two chapters which present detailed individuality summaries for the five girls and the five boys studied are among the best in the book.

Particularly good are the concise summary characterizations (pp. 483 and 557). These personality portraits are adequate and colorful, but though we see children vividly we do not get any dynamic key to their personalities. Without suggesting that the children be classified into types, it seems conceivable that something a little more workable (from the point of view of additional cases and future research) might have been done with this material.

The Rorschach results are extremely suggestive. They form a valuable supplement to the information available on each individual child. More than this, however, there are obtainable from a summary of these results certain clear trends, true of the whole group. The low proportion of human responses was taken to indicate a certain psychological loneliness in these children. The authors state (p. 587):

According to the Rorschach interpretation all the children in the group suffered deep insecurity as a result of the conflict between the child world of impulse, freedom, unrestrained wish and the adult world which is overpowering, demanding and restraining. Because of this conflict they become evasive, defensive, stultified in ways that influenced strongly their relation to real experience. . . . The children's clearest conflicts seem to have to do with: (1) accomplishments, ability, performance, standards set by themselves; (2) being accepted as a member of the child group; (3) establishing a relation with adults and the authority they represent.

For practically all these 7-year-olds, relations with adults offer serious problems which may take one of these main forms. . . . (1) Excessive dependence upon adults. (2) Resistance, rebellion, resentment against adult bossiness, domination and restraints. (3) Identification and competition with adults, attempting to reach over into the adult world and live in it. . . . All the children appear to be ridden by feelings of deep insecurity generated primarily in the need to live two lives which are either quite remote from each other or else in sharp conflict with each other. One of these lives is what the child wishes, his child world (which is) truly a dream world. This world is inevitably threatened and violated, not only by the stringencies and requirements of all reality, but most particularly by the hostile influences of that part of reality which is the adult world.

The clearness and to some extent the uniformity of the results of the Rorschach test are very suggestive as to the value of a somewhat controlled, standardized situation as against the all-inclusive social

situations of every-day school life as a method for gathering information about both personality and "agedness," particularly since the picture the Rorschach gives of seven (plus)-year-oldness is not only more clearcut but also more strikingly similar to that found by other researchers, than is any description arrived at by other methods used here.

Among the many insightful points brought out by the authors—far too many to mention here—are the following especially important ones. The fact that these children objectify their deepest feelings and attach them to people and things and ideas removed from themselves is considered an important trend of which educators should take account. We should realize that the development of prejudices in the child is "one of the steps in his normal emotional and intellectual growth." Prejudice may be one of his first steps toward understanding the world of ideas. We should not expect the child in his first contact with social concepts to be slow and reasoned. His impulse to hate what he disapproves of, to adore what he likes, is natural.

Equally suggestive is the conclusion that:

"setting up a non-competitive school atmosphere can only go part of the way in relieving the stress and strain of the children's lives. They may not have been competitive with each other but they showed in many ways that prowess and mastery were of deep concern to them, to an extent that might be considered ambivalent with their keen pleasure in purely creative procedures."

It was found that these children

"were holding themselves to standards of their own with psychological effects resembling what happens when children are held to standards set by others. We can only conclude that standards are part of our own lives and a fundamental basis for organizing behavior in our society. Thus, it becomes the responsibility of the modern educator to weigh the psychological effects of reducing the group standards for achievement and to take into consideration what substitutes the children may create for themselves for these relatively external standards."

There are of course many disadvantages to the somewhat indiscriminating method of gathering data used here to such an extent. The focalization of both observation and data made possible by rel-

ing chiefly on somewhat standardized situations should perhaps be kept in mind by anyone discouraged by the wealth of detail but lack of clear central trends of the present 658 pages of information about the personalities of 10 7-year-old children.

The authors state, "The situation was complicated by the fact that in none of these records were the recorders looking for any single type of behavior nor were they studying any one phase of the child's activity alone." Later, the records were broken down into "episodes of action" and were checked against each other for accuracy. However, even the most detailed and accurate recording of this type, though having the advantages of being objective and impartial, cannot include everything that the child does and moreover it cannot give the dynamic and useable information which a more intentful and to some extent-discriminating observation does give. The writers themselves imply ~~this criticism~~ when they say that though the children seem conversant with ~~number~~, "it is difficult from this material to describe their general ~~number~~ concepts." The same criticism holds good for many of their other concepts as well.

As to presentation, it is much too wordy. The reader while entertained throughout, frequently gets lost in a mass of detail. A certain diffuseness seems to characterize not only the gathering of data and the writing of the book but also the reader's impression when he has finished. An earlier inclusion of the individuality summaries might have helped guide the reader through the mass of detail. It is a flat presentation. We do not get and do not sense that the authors get a feeling for the dynamics of seven-year-oldness.

The book makes a definite factual contribution both to our knowledge about the 7-year-old age range and to available case data on personalities of individual children of this age. There is far too little such information available. The scientific accuracy with which the project was undertaken and reported is admirable. There is presented here—and the detailed basic data must contain a good deal more—a wealth of invaluable material which is probably unique in the literature. The book is rich in source material which has by no means been fully exploited by the writers. It would be possible to summarize material on dynamic language behavior, on sex differences, on many topics which are not presented in summary.

The authors are to be congratulated on the conception of this

research and on the scholarly manner in which it has been carried out. Its contribution is unquestionably great. The numerous criticisms presented in this review are presented chiefly from the point of view of further research in this field rather than as basic criticisms of this extremely painstaking study.

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BOOKS RECENTLY RECEIVED

(There will always be two pages of book titles, listed in the order of receipt, i.e., the most recently received books will be found at the end of the list.)

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